




MAKING THE DIFFERENCE ONE WELL AT A TIME!



WHY *EXP*?

- THE SIMPLISTIC DESIGN HELPS MAKE IT THE MOST ECONOMICALLY FEASIBLE TECHNOLOGY IN THE MARKETPLACE FOR STIMULATION, ACIDIZING, SCALE AND SOLIDS REMOVAL.
 - AS AN ADDED VALUE FEATURE THIS TECHNOLOGY CREATES TURBULENT FLOW POCKETS ON THE ANNULUS WHICH KEEP SOLIDS IN SUSPENSION MUCH LONGER THAN CONVENTIONAL LAMINAR ANNULAR FLOW DURING CLEANOUTS THRU A SERIES OF DYNAMIC HIGH AND LOW PRESSURE EVENTS.
 - THE *EXP* CAN BE UTILIZED IN OIL, GAS, AND WATER WELLS TO INCREASE PRODUCTION BY CONDUCTING OPTIMAL CLEANING OF THE WELLBORE AND NEAR WELLBORE REGIONS.
 - WHEN UTILIZED TO CLEAN INJECTION, WASTEWATER AND DISPOSAL WELLS THE *EXP* WILL HELP IMPROVE INJECTIVITY BY BREAKING AND REMOVING DEBRIS WITHIN THE NEAR REGION.
 - DURING STIMULATION AND INJECTION OF CHEMICALS THE TURBULENT FLOW WILL ASSIST IN DISTRIBUTION FURTHER INTO THE FRACTURES AND AVAILABLE PORE SPACE
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JETTING STRUCTURE COMPARISON

ROTATING NOZZLES



- HAS MOST FLUID SURFACE AREA
- EFFECTIVE 0-12"
- REMOVES SCALE, PARAFFIN AND DEBRIS
- LIMITED TO AREA IN AND NEAR WELLBORE
- SPIN TOOL/FLOW DEPENDENT
- HIGH VELOCITY PORT OUTFLOW
- MECHANICAL MOVING PARTS WITHIN TOOL

CAVITATIONAL FLOW



- EFFECTIVE 0-3 INCHES FROM EXIT PORT
- EFFECTIVE IN REMOVAL OF WELLBORE SCALE AND TUNNELS
- NOT SUITED FOR FAR REACH
- LIMITED TO DEPTH DUE TO RESERVOIR PRESSURES
- CURRENTLY **NOT** AVAILABLE IN ENERGY SECTOR

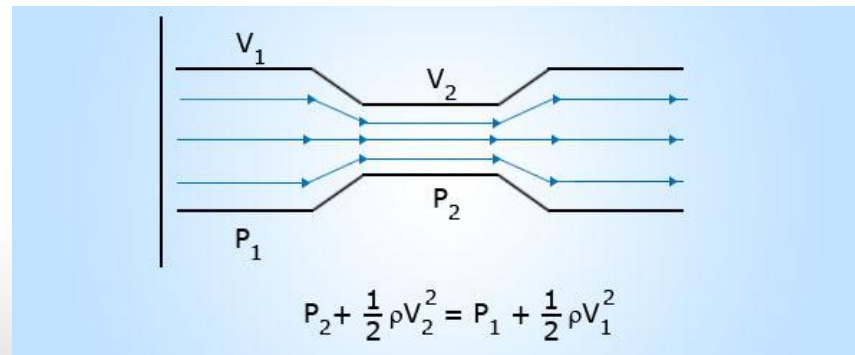
EXP TECHNOLOGY STRUCTURE

EXP has combined Pulse, Cavitation and Oscillating

- ✓ Effective Amplitude 36" to 48" from ports
- ✓ Removes scale, paraffin, sand bridges and debris from region
- ✓ Can handle more fluid and pressures than any other type of technology
- ✓ Multi-port orientation outflow
- ✓ Can be ran on CT or WO Rig
- ✓ **Only** technology that has Pulse, Oscillating, and Cavitation
- ✓ NO MOVING PARTS!!!

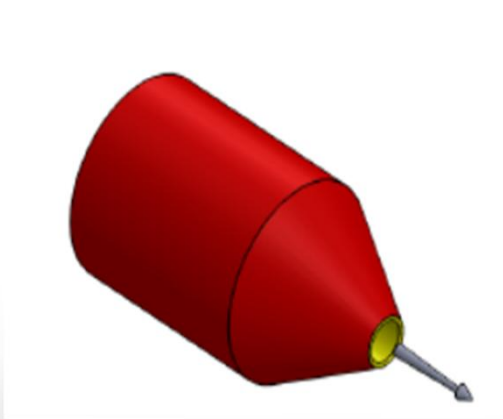
HOW IT WORKS!!!

Extreme Pulse Technology has been able to implement multi-flow conditioning patterns thru a series of resonating chambers, which create dynamic high and low pressure events with high and low velocities that successfully aid in the recovery of both oil and gas during workover (cleanout) operations. The *ExP* ports of the nozzle can be oriented in multi-directional flow patterns. They are also able to be custom built to client specifications without impeding the performance.

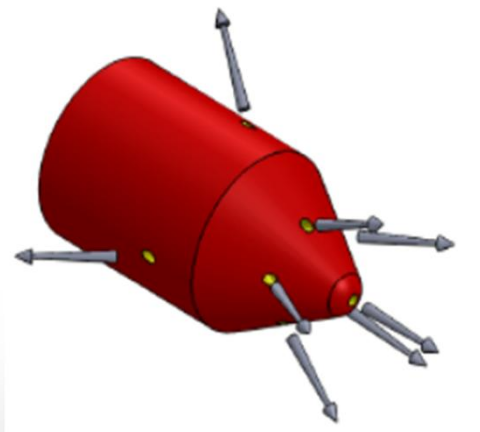


MULTI-PORT ORIENTED NOZZLES

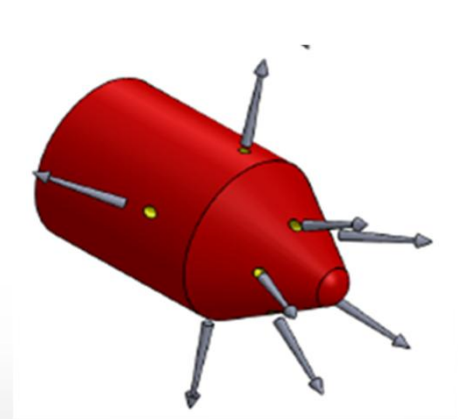
SINGLE PORT



BACK & DOWN PORTS



OUT & DOWN PORTS

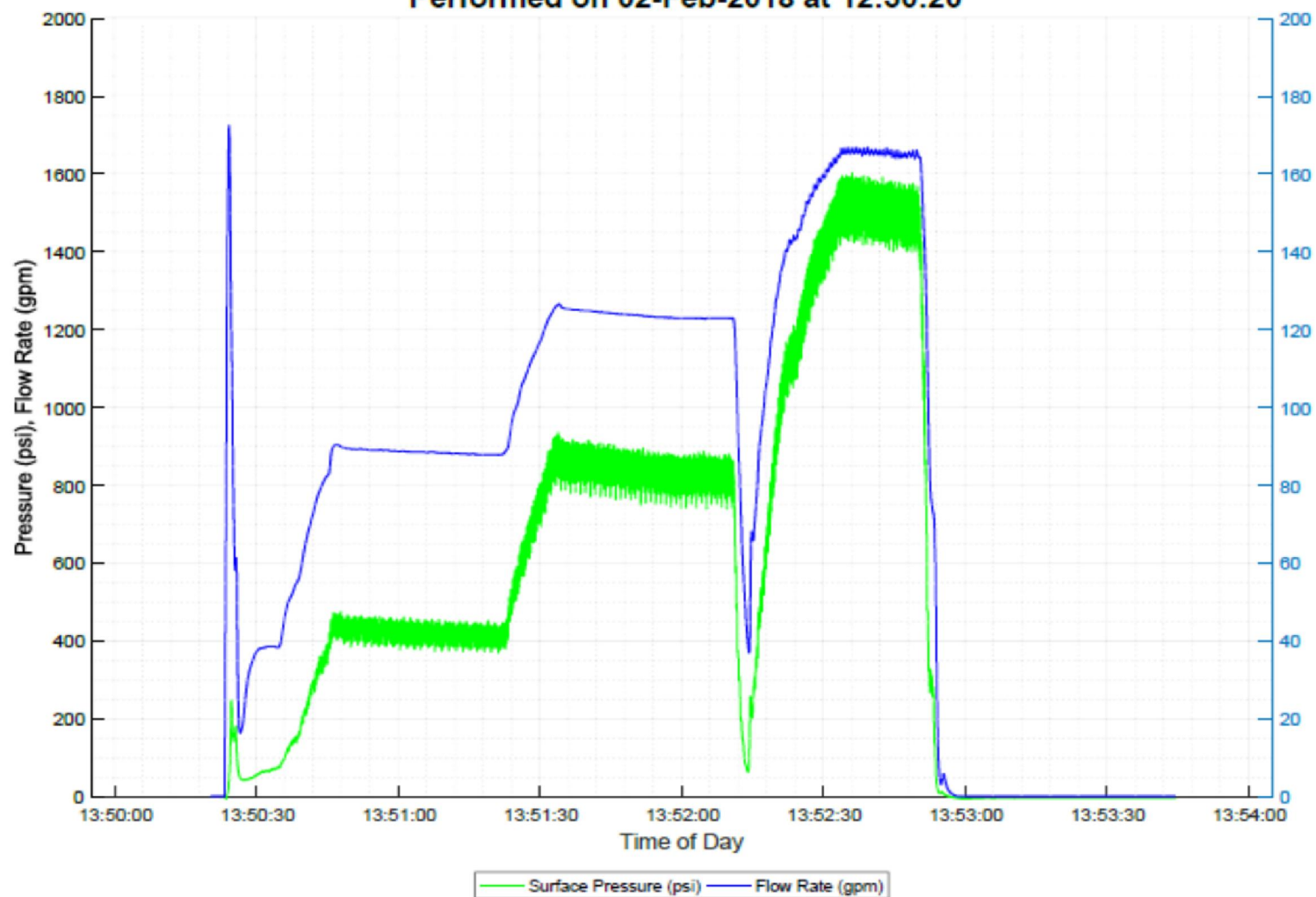


EXP SPECS

Tool O.D.	1.33"	1.69"	2.0"	2.375"	2.875"	3.125"	3.5"
Length	9.125"	12"	12"	12"	12"	18"	18"
Min. Flow	7 GPM	21 GPM	21 GPM	21 GPM	21 GPM	42 GPM	42 GPM
Max. Flow	1.75 bls	4 bbls	5 bbls	6 bbls	6 bbls	6 bbls	6 bbls
N2 Compatible	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Moving Parts	No	No	No	No	No	No	No
Redress Required	No	No	No	No	No	No	No

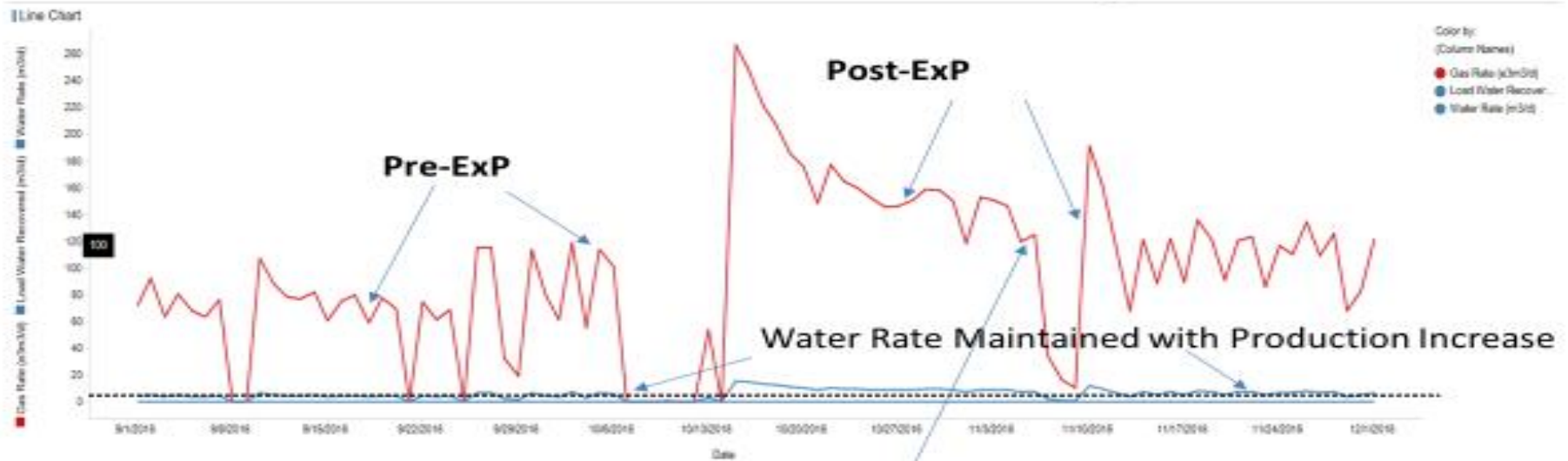
File: EXP_Nozzle_Flow_Test_2018_02_02_12_50_20.tdms

Performed on 02-Feb-2018 at 12:50:20



December 2016

Pre-& Post EXP Intervention Production Graph



EXP

CASE HISTORY #1

PROBLEM: SAND AND DEHYDRATED 10.5 LB DRILLING MUD AND DEBRIS IN TUBING & WELLBORE

OBJECTIVE: UTILIZE 1.25" CT WITH THE 1.33" EXP BHA TO REMOVE SAND, MUD AND DEBRIS FROM INSIDE THE TUBING AND WELLBORE, UTILIZING PRODUCED WATER AND N2 (WHEN NEEDED). SPOT 10% INHIBITED AND NITRIFIED ACID ACROSS THE PERFORATIONS TO HELP WITH STIMULATION OF THE FORMATION.

SITUATION

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LOCATION: COTTON VALLEY, EAST TEXAS

PROBLEM: DEHYDRATED 10.5 LB DRILLING MUD AND SAND BRIDGES IN WELLBORE WITH SOME SCALE

PROCEDURE: THE **EXP** TECHNOLOGY WAS DEPLOYED VIA 1.25" THIRD PARTY COILED TUBING. AN INITIAL PUMP RATE OF .25 BBLS/MIN WITH 300 CFM N2 WAS PUMPED WITH CIRCULATING PRESSURES OF 2,000PSI. WHEN THE FIRST SAND BRIDGE WAS ENCOUNTERED AT 6,183 THE CT WAS PICKED UP BY 50FT AND THE FLUID RATE WAS INCREASED TO .5 BBLS/MIN WITH 200LBS WOB, WHICH REMOVED THE DEBRIS BRIDGE. AT 8,621 A SECOND BRIDGE WAS ENCOUNTERED. WITHIN 10 MINUTES THE COIL PUSHED THROUGH MORE BLOCKAGES. THE EXP CONTINUED TO REMOVE THE OBSTRUCTIONS IN A TIMELY MANNER TO TD. UPON COMPLETE REMOVAL OF ALL DEBRIS, 10% MUD ACID WAS SPOTTED ACROSS THE PERFORATIONS TO HELP STIMULATE THE NEAR WELLBORE REGION OF THE WELL.

TOTAL TIME FROM RIH TO TD: 5 HOURS 22 MINUTES

RESULT: REMOVED ALL MUD, SAND AND DEBRIS

PRE-EXP INTERVENTION: **60-80 MCF (GROSS)**

POST EXP INTERVENTION: **360-440 MCF (GROSS)**

EXP

CASE HISTORY #2

PROBLEM: CALCIUM CARBONATE SCALE WITH SOME FE IN TUBING, CASING AND PERFORATIONS

OBJECTIVE: UTILIZE 1.25" CT WITH 1.33" EXP BHA FOR REMOVAL OF BLOCKAGES AND SCALE FROM TUBING, CASING AND PERFORATIONS UTILIZING PRODUCED AND FRESH WATER. WITH A FINAL RUN OF 8% HCL FOR STIMULATION ACROSS THE PRODUCTION ZONE.

SITUATION

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LOCATION: PERMIAN BASIN, WEST TEXAS

PROBLEM: CALCIUM CARBONATE SCALE IN TUBING, CASING AND NEAR WELLBORE REGION

PROCEDURE: THE EXP TOOL WAS DEPLOYED VIA 1.25" THIRD PARTY COILED TUBING. AN INITIAL PUMP RATE OF .25 BBLS/MIN WAS PUMPED WITH CIRCULATION PRESSURES OF 1,200 PSI. WHEN A BLOCKAGE WAS ENCOUNTERED THE CT WAS PICKED UP BY 50 FT AND FLUID RATE INCREASED TO .5 BBLS/MIN, WHICH REMOVED THE DEBRIS BLOCKAGE WHICH WAS SEEN AT SURFACE 16 MINUTES LATER. THROUGHOUT THE OPERATIONS LARGE PIECES OF SCALE AND DEBRIS WAS OBSERVED IN THE FLOW-BACK RETURNS AT SURFACE. AS DEPTH PROGRESS CONTINUED FLUID RATES INCREASED TO INCREASE AV'S, WHILE TURBULENT FLOW KEPT SOLIDS IN SUSPENSION. UPON COMPLETE REMOVAL OF ALL SCALE AND DEBRIS, 8% HCL WAS SPOTTED ACROSS THE PERFORATIONS TO HELP STIMULATE THE NEAR WELLBORE.

TOTAL TIME FROM RIH TO TD: 4 HOURS 19 MINUTES

RESULT: REMOVAL OF ALL SCALE

PRE- EXP INTERVENTION: 83 BBLS

POST EXP INTERVENTION: 157 BBLS

EXP

CASE HISTORY #3

PROBLEM: IRON SULFIDE SCALE IN TUBING, CASING, PERFORATIONS AND NEAR WELLBORE

OBJECTIVE: UTILIZE 1.25" CT WITH 1.33" EXP BHA FOR REMOVAL OF BLOCKAGES AND SCALE FROM TUBING, CASING AND PERFORATIONS UTILIZING PRODUCED AND FRESH WATER WITH A FINAL RUN OF 7% HCL FOR STIMULATION ACROSS THE PRODUCTION ZONE.

SITUATION

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LOCATION: PERMIAN BASIN, WEST TEXAS (MAY 2018)

PROBLEM: IRON SULFIDE SCALE IN TUBING, CASING PERFORATIONS AND NEAR WELLBORE REGION

PROCEDURE: THE EXP TOOL WAS DEPLOYED VIA 1.25" THIRD PARTY COILED TUBING. AN INITIAL PUMP RATE OF .40 BBLS/MIN WAS PUMPED WITH CIRCULATION PRESSURES OF 1,480 PSI. WHEN A BLOCKAGE WAS ENCOUNTERED THE CT WAS PICKED UP BY 25 FT AND FLUID RATE INCREASED TO .70 BBLS/MIN, WHICH REMOVED THE FE SULFIDE BRIDGE BLOCKAGE WHICH WAS OBSERVED AT SURFACE DUE TO THE PULSATING OF THE TOOL WHICH KEPT THE SOLIDS IN SUSPENSION FOR LONGER PERIODS OF TIME. THROUGHOUT THE OPERATIONS CONTINUOUS LARGE QUANTITIES OF FE SULFIDE SCALE WERE OBSERVED IN THE FLOW-BACK RETURNS AT SURFACE. AS DEPTH PROGRESS CONTINUED, FLUID RATES INCREASED TO INCREASE AV'S, WHILE TURBULENT FLOW KEPT SOLIDS IN SUSPENSION. UPON COMPLETE REMOVAL OF ALL FE SULFIDE SCALE, 7% HCL WAS SPOTTED ACROSS THE PERFORATIONS TO HELP STIMULATE THE NEAR WELLBORE.

TOTAL TIME FROM RIH TO TD: 7 HOURS 35 MINUTES

RESULT: REMOVAL OF ALL SCALE

PRE- EXP INTERVENTION: 45 BBLS

POST EXP INTERVENTION: TBD

EXP POWER SUB

CASE HISTORY #4

PROBLEM: DEHYDRATED (SOLIDIFIED) 10LB DRILLING MUD POST CEMENT SQUEEZE

OBJECTIVE: UTILIZE 2 7/8" WO STRING WITH 2 7/8" EXP TECHNOLOGY WITH 3 5/8" ROCK BIT TO DRILL AND REMOVE MUD AND DEBRIS FROM INSIDE THE CASING UTILIZING PRODUCED WATER.

SITUATION

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LOCATION: HAYNESVILLE, EAST TEXAS

PROBLEM: 100 FEET OF PROGRESS IN 4 DAYS OF DRILLING 10 LB DEHYDRATED (SOLIDIFIED) DRILLING MUD MIXED WITH DEBRIS IN THE WELLBORE

PROCEDURE: THE **EXP POWER SUB** TECHNOLOGY WAS DEPLOYED VIA 2 7/8" THIRD PARTY WORKOVER DRILL STRING. AN INITIAL PUMP RATE OF .75 BBLS/MIN WAS PUMPED WITH CIRCULATION PRESSURE <500 PSI. WHEN THE SOLIDIFIED MUD WAS ENCOUNTERED AT 5,750' THE FLUID RATE WAS INCREASED TO 3 BBLS/MIN WHICH INCREASED THE HAMMER EFFECT OF THE FLUID PASSING THROUGH THE EXIT PORTS OF THE BIT. AFTER 2 MINUTES, THE ROCK BIT BROKE THROUGH THE HARDEN BRIDGE. THE WO STRING WAS PUSHED TO TD AT AN AVERAGE OF 25FT/MIN. ONCE THE FLOW-BACK RETURNS SHOWED LESS THAN A TRACE AMOUNTS OF SOLIDS, THE OPERATION WAS COMPLETE.

TOTAL TIME FROM RIH TO TD: 6 HOURS 30 MINUTES

RESULT: MUD AND DEBRIS REMOVED

PRE- EXP POWER SUB : **100' IN 4 DAYS**

POST EXP POWER SUB: 4,560' IN 3 HOURS

