

PRUITT OPTIMAL CASE STUDY

MPD Cementing or MPC: Cementing Solution for Problem Formations.

Managed Pressure Cementing (MPC) is a cementing solution for narrow and ultra narrow pressure windows that cannot be cemented using conventional methods. MPC is a variation of Managed Pressure Drilling (MPD) technology and works on the same principles as MPD.

Pruitt has successfully planned and executed multiple MPC projects. Several of these formations had very low fracture gradients, low formation leak-off limits, severe loss of circulation challenges, and/or were highly fractured and faulted. These wells were cemented with minimal losses by managing the Surface Backpressure (SBP) in static and dynamic conditions, similar to a Constant Bottomhole Pressure (CBHP) MPD operation, and there by controlling the wellbore pressures throughout the cementing operation as fluids of different compositions, properties and densities were circulated at different rates.

Challenge/Problem: Cementing pipe in formations that have narrow/ultra narrow pressure windows and challenges such as (a) severe loss of circulation, (b) low formation leak-off, (c) low formation strength, (d) highly faulted and fractured formations, (e) high pressure fluid flows, (f) formation stability issues, etc.

Action/Solution: Perform MPC by using Constant Bottomhole Pressure (CBHP) MPD principles to minimize losses and avoid formation fluid gains, and to place cement at desired depth(s).

Execution/Results: Pruitt Optimal has successfully planned and executed MPC on multiple projects (10+) in USA to cement pipe using static and dynamic Surface Backpressure.

Pruitt MPD system with single/dual choke(s) and Coriolis meter was used to manage the surface pressures and minimize losses and eliminate gains in such Managed Pressure Cementing operations.

Details: Different operators used Pruitt Optimal MPD services to perform Managed Pressure Cementing.

1. An operator in US cemented several wells on a multi well pad using MPC on their production openhole section. MPD was used for drilling the openhole on both intermediate and production sections on 8 wells, while MPC was used on 5 of these wells (≤ 0.5 ppg pressure window).
2. Another operator in US had multiple wells with a very high permeability and communication across multiple formation layers in the production hole. The objective was to stay within a 0.5 ppg window while cementing entire production hole section using multiple density cementing fluids.

Typical MPC Solution



DRILLING PARAMETERS							MUD PROPERTIES		
ROP:	10.894ft	0.0ft/min	BHP:	6396psi	WHP:	2psi	DENSITY:	8.4ppg	MODE
RPM:	10.5612ft	0	ECD:	11.65ppg	SPP:	1823psi	FLOW:	2bbbl/min	F. TYF
FLUID ROLLOVER SCHEDULE									
FLOW	MW IN	MW OUT	WHP	ECD	EMW	VOLUME	ST		
0	9.4	9.4	295	9.94	9.94	0.0	0		
4	10.0	9.4	129	9.94	9.63	60.0	14		
4	10.0	9.4	129	9.94	9.63	60.0	14		
4	12.5	9.4	75	9.94	9.66	180.0	45		
4	12.5	9.4	66	9.94	9.66	182.9	44		
4	13.5	9.4	0	10.53	10.25	133.1	32		
4	13.5	9.4	0	10.55	10.28	137.8	32		
4	8.33	9.4	0	10.59	10.31	7.3	2		
4	8.33	9.4	0	10.6	10.33	10.0	2		
4	8.4	9.4	0	11.58	11.24	137.3	32		
4	8.4	9.4	0	11.6	11.26	140.0	32		
2	8.4	9.4	2	11.65	11.39	20.5	5		

Typical Pressure Schedule