Schlumberger

FracCAT Treatment Report

Well : Hazen 1928 #24-1
Field : Bravo Dome, west
Formation : Tubb Sand

Well Location :
County : Harding
State : new mexico
Country : United States

Prepared for
Client : Whiting Petroleum Corporation
Client Rep : Robert McNaughton
Proposal No : 1
Date Prepared : 07/04/2014

Prepared by
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Comments : Stage1

Section 1: Well Description

Deviated Hole: NO
Treating Down: CASING
Flush Volume to 2934.0 ft is 69.8 bbl

Casing			
OD (in)	Weight (lb/ft)	ID (in)	Depth (ft)
5.500	15.5	4.950	3173.0

Section 2: Perforations

Perforations						
Top MD (ft)	Top TVD (ft)	Bottom MD (ft)	Bottom TVD (ft)	Shot Density (shot/ft)	Number	Diameter (in)
2898.0	2898.0	2912.0	2912.0	6.00	84	0.32
2920.0	2920.0	2926.0	2926.0	6.00	36	0.32
2934.0	2934.0	2942.0	2942.0	6.00	48	0.32

Section 3: Fluid Description

Fluid Name: WF140			
Additive Name	Additive Type	Solid Conc (lb/mgal)	Liquid Conc (gal/mgal)
J580, Gelling Agent	GELLINGAGT	40.0	
J218, Breaker	BREAKER	2.0	
B244B, Microbiocide	BIOCIDE		0.2
L071, Temporary Clay Stabilizer	CLAYSTABILIZ		1.0
L065, Scale Inhibitor	INHIBITORAID		0.5

Fluid Name: WF140 [CO2 65Q]			
Additive Name	Additive Type	Solid Conc (lb/mgal)	Liquid Conc (gal/mgal)
J580, Gelling Agent	GELLINGAGT	40.0	
J218, Breaker	BREAKER	2.0	
F109, Foaming Agent	SURFACTANT		4.0
F112, EZEFLO Surfactant	SURFACTANT		2.0
B244B, Microbiocide	BIOCIDE		0.2
L071, Temporary Clay Stabilizer	CLAYSTABILIZ		1.0
J475, EB-CLEAN Breaker	BREAKERENCAP	1.0	
L065, Scale Inhibitor	INHIBITORAID		0.5

Section 4: Designed Pump Sched. - Ramp

Designed Pump Schedule Ramp									
Step #	Step Name	Slurry Volume (bbl)	Pump Rate (bbl/min)	Pump Time (min)	Fluid Name	Fluid Volume (gal)	Prop Name	Prop Conc (PPA)	Prop Mass (lb)
1	PrePAD	47.6	30.0	1.6	WF140	2000		0.0	0
2	PAD	45.8	10.5	4.4	WF140 [CO2 65Q]	1925		0.0	0
3	2.0 PPA	20.1	11.8	1.7	WF140 [CO2 65Q]	700	SinterLite Bauxite 16/30	5.7	4000
4	4.0 PPA	29.5	13.0	2.3	WF140 [CO2 65Q]	875	SinterLite Bauxite 16/30	11.4	10000
5	6.0 PPA	51.3	17.7	2.9	WF140 [CO2 65Q]	1500	SinterLite Bauxite 16/30	12.0	18000

Designed Pump Schedule Ramp									
Step #	Step Name	Slurry Volume (bbl)	Pump Rate (bbl/min)	Pump Time (min)	Fluid Name	Fluid Volume (gal)	Prop Name	Prop Conc (PPA)	Prop Mass (lb)
6	8.0 PPA	26.9	21.9	1.2	WF140 [CO2 65Q]	780	SinterLite Bauxite 16/30	12.3	9600
7	Flush	69.8	30.0	2.3	WF140	2933		0.0	0

Designed CO2 Pump Schedule Ramp		
Step #	Step Name	CO2 Rate (bbl/min)
1	PrePAD	0.0
2	PAD	15.7
3	2.0 PPA	14.7
4	4.0 PPA	13.7
5	6.0 PPA	10.3
6	8.0 PPA	7.2
7	Flush	0.0

Designed Ramp Totals				
Slurry (bbl)	Pump Time (min)	Clean Fluid (gal)	Proppant (lb)	CO2 (bbl)
291.0	16.4	10713	41600	163.4

Section 5: As Measured Pump Schedule

As Measured Pump Schedule										
Step #	Step Name	Slurry Volume (bbl)	Slurry Rate (bbl/min)	Pump Time (min)	Fluid Name	Fluid Volume (gal)	Proppant Name	Max Prop Conc (PPA)	Prop Conc (PPA)	Prop Mass (lb)
1	PrePAD	66.4	17.6	4.3	WF140	2785		0.0	0.0	0
2	PAD	45.8	9.9	4.9	WF140 [CO2 65Q]	1933		0.0	0.0	0
3	2.0 PPA	20.1	10.9	1.8	WF140 [CO2 65Q]	717	SinterLite Bauxite 16/30	5.8	2.3	3443
4	4.0 PPA	29.5	12.2	2.4	WF140 [CO2 65Q]	891	SinterLite Bauxite 16/30	11.6	8.9	9464
5	6.0 PPA	51.3	16.4	3.1	WF140 [CO2 65Q]	1511	SinterLite Bauxite 16/30	12.1	3.4	17624
6	8.0 PPA	36.6	19.9	1.8	WF140 [CO2 65Q]	1160	SinterLite Bauxite 16/30	12.4	0.0	10484
7	Flush	68.3	19.9	3.5	WF140	2882	SinterLite Bauxite 16/30	0.0	0.0	19

Stage Pressures & Rates						
Step #	Step Name	Average Slurry Rate (bbl/min)	Maximum Slurry Rate (bbl/min)	Average Treating Pressure (psi)	Maximum Treating Pressure (psi)	Minimum Treating Pressure (psi)
1	PrePAD	17.6	20.0	702	1563	19
2	PAD	9.9	20.0	1098	1214	996
3	2.0 PPA	10.9	12.1	1177	1195	1124
4	4.0 PPA	12.2	15.7	1122	1185	1062
5	6.0 PPA	16.4	17.6	1014	1117	873
6	8.0 PPA	19.9	20.0	890	945	828
7	Flush	19.9	20.0	949	1029	68

As Measured CO2 Pump Schedule				
Step #	Step Name	CO2 Volume (bbl)	CO2 Rate (bbl/min)	Injection Rate (bbl/min)
1	PrePAD	14.0	3.3	20.9

As Measured CO2 Pump Schedule				
Step #	Step Name	CO2 Volume (bbl)	CO2 Rate (bbl/min)	Injection Rate (bbl/min)
2	PAD	65.3	13.0	23.0
3	2.0 PPA	25.5	13.9	24.8
4	4.0 PPA	31.0	13.0	25.2
5	6.0 PPA	31.8	10.3	26.6
6	8.0 PPA	12.9	7.0	26.9
7	Flush	16.5	7.0	24.8

As Measured Totals			
Slurry (bbl)	Pump Time (min)	Clean Fluid (gal)	Proppant (lb)
317.9	21.8	11878	41034

Average Treating Pressure:	953 psi
Maximum Treating Pressure:	1563 psi
Minimum Treating Pressure:	19 psi
Average Injection Rate:	24.3 bbl/min
Maximum Injection Rate:	27.4 bbl/min
Average Horsepower:	368.6 hhp
Maximum Horsepower:	598.3 hhp
Maximum Prop Concentration:	12.4 PPA

Section 6: Material Balance

Material Balance	
Material Name	Quantity Pumped
WF140	5667 gal
WF140 [CO2 65Q]	6210 gal
SinterLite Bauxite 16/30	41034 lb
J580, Gelling Agent	0 lb
J218, Breaker	0 lb
B244B, Microbiocide	0 gal
L071, Temporary Clay Stabilizer	0 gal
L065, Scale Inhibitor	0 gal
F109, Foaming Agent	0 gal
F112, EZEFLO Surfactant	0 gal
J475, EB-CLEAN Breaker	0 lb
CO2	197.1 bbl

Section 7: Job Messages

Message Log							
#	Time	Message	Treating Pressure (psi)	Annulus Pressure (psi)	Total Slurry (bbl)	Slurry Rate (bbl/min)	Prop. Conc. (PPA)
1	17:50:27	Prime Up SPF-37974	111	-3750	0.0	5.1	0.0
2	17:52:35	Prime Up SPF-26339	96	-3750	0.0	4.9	0.0
3	17:55:04	Set Brakes	70	-3750	0.0	3.4	0.0
4	17:55:31	Knock Off Prime Up Hose	69	-3750	0.0	0.0	0.0
5	17:56:40	Area Clear	66	-3750	0.0	0.0	0.0
6	17:57:42	High PSI Test	5347	-3750	0.0	0.0	0.0
7	18:01:13	Leak on Line	8	-3750	0.0	0.0	0.0
8	18:03:23	Low PSI Test	3054	-3750	0.0	1.0	0.0
9	18:04:03	High PSI Test	4497	-3750	0.0	0.0	0.0
10	18:04:25	Pressure Test Lines	4491	-3750	0.0	0.0	0.0
11	18:04:30	Pressure Test Ok	4491	-3750	0.0	0.0	0.0
12	18:05:35	Open Wellhead	439	-3750	0.0	0.0	0.0
13	18:06:48	Start PrePAD Automatically	20	-3750	0.0	17.6	0.0
14	18:06:48	Start Propped Frac Automatically	20	-3750	0.0	17.6	0.0
15	18:06:48	Start Stage 1 Automatically	20	-3750	0.0	17.6	0.0
16	18:06:48	Started Pumping	20	-3750	0.0	17.6	0.0
17	18:07:26	Activated Extend Stage	19	-3750	11.1	17.5	0.0
18	18:11:05	Deactivated Extend Stage	1247	-3750	66.4	19.9	0.0
19	18:11:05	Start PAD Manually	1247	-3750	66.4	19.9	0.0
20	18:11:27	Stage at Perfs: PrePAD	1047	-3750	70.9	9.4	0.0
21	18:14:35	Stage at Perfs: PAD	1099	-3750	99.7	9.1	0.0
22	18:15:58	Start 2.0 PPA Automatically	1133	-3750	112.3	9.1	0.0
23	18:15:58	Started Pumping Prop	1133	-3750	112.3	9.1	0.0
24	18:17:48	Start 4.0 PPA Automatically	1175	-3750	132.4	12.1	5.3
25	18:19:13	Stage at Perfs: 2.0 PPA	1089	-3750	149.5	12.1	11.3
26	18:20:12	Start 6.0 PPA Automatically	1122	-3750	162.0	15.8	9.3
27	18:21:03	Stage at Perfs: 4.0 PPA	1028	-3750	175.9	16.3	11.9
28	18:23:19	Start 8.0 PPA Automatically	951	-3750	213.2	19.0	11.3
29	18:23:23	Activated Extend Stage	936	-3750	214.5	19.6	10.8
30	18:23:40	Stage at Perfs: 6.0 PPA	940	-3750	220.1	19.9	12.2
31	18:25:09	Deactivated Extend Stage	828	-3750	249.7	20.0	-0.0
32	18:25:09	Start Flush Manually	828	-3750	249.7	20.0	-0.0
33	18:26:52	Stage at Perfs: 8.0 PPA	938	-3750	283.9	19.9	-0.0
34	18:28:43	Shutdown - ISIP	796	-3750	317.9	0.0	-0.0
35	18:33:43	5 MIN	730	-3750	317.9	0.0	-0.1
36	18:38:43	10 MIN	706	-3750	317.9	0.0	-0.0
37	18:43:43	15 MIN	690	-3750	317.9	0.0	-0.0
38	18:44:18	Close Wellhead	688	-3750	317.9	0.0	-0.0
39	18:47:56	Bleed Off lines	67	-3750	317.9	0.0	-0.1
40	18:47:59	Stopped Pumping Prop	64	-3750	317.9	0.0	-0.1

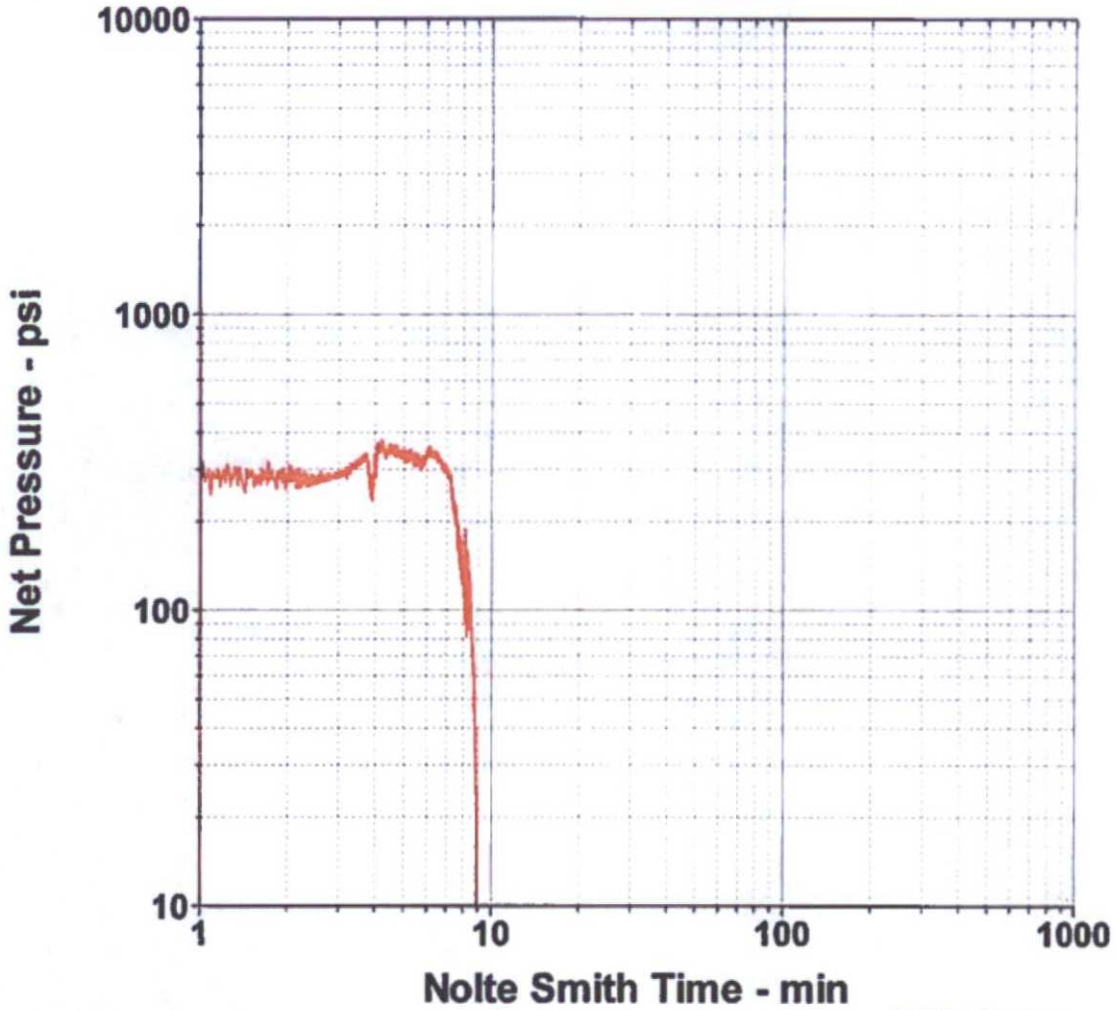
FracCAT*

Closure Pressure = 2120 psi

Whiting Petroleum Corpora
Hazen 1928 #24-1
06-03-2014

Nolte Smith Post Job Plot

Net Pressure



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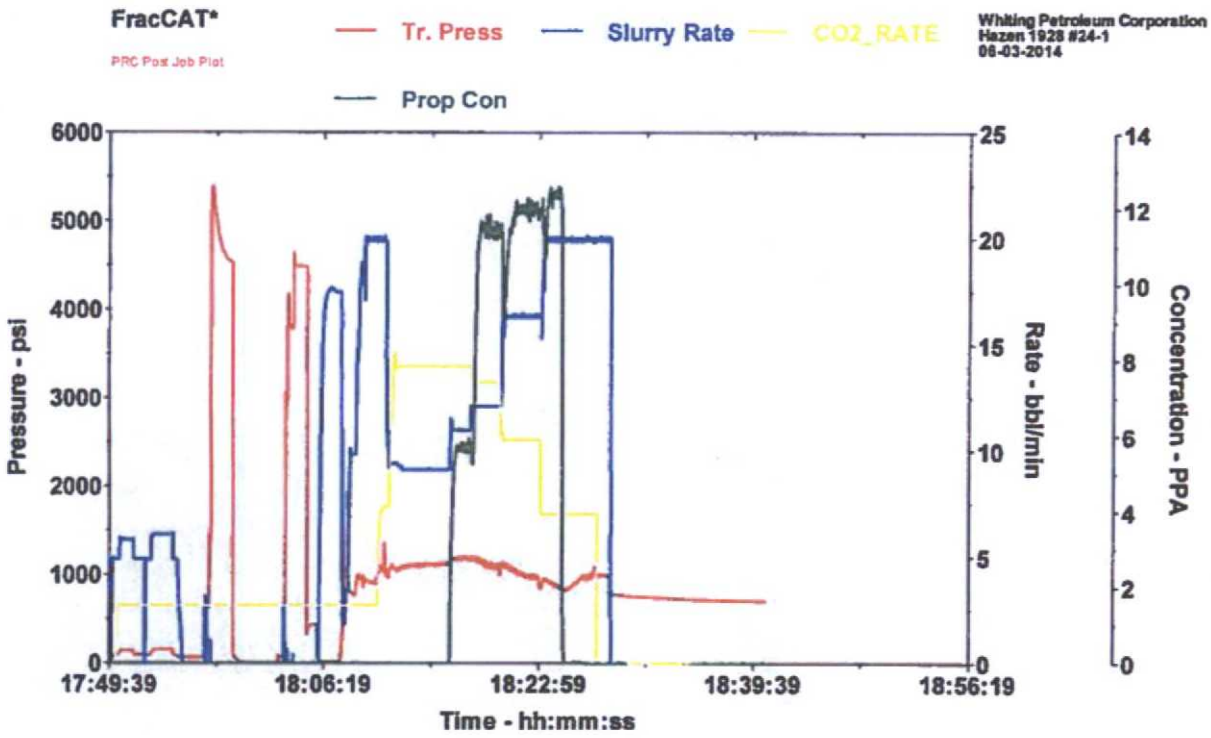

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