



FracCAT Treatment Report

Well : Lewis 1928 #2-1
Field : Bravo Dome, west
Formation : Tubb Sand

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

Prepared for

Client : Whiting
Client Rep : Robert McNaughton
Proposal No : 1
Date Prepared : 02/04/2014

Prepared by

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Comments : Stage 1

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Section 1: Well Description

Deviated Hole: NO
 Treating Down: CASING
 Flush Volume to 2642.0 ft is 62.9 bbl

Casing			
OD (in)	Weight (lb/ft)	ID (in)	Depth (ft)
5.500	15.5	4.950	2879.0

Section 2: Perforations

Perforations						
Top MD (ft)	Top TVD (ft)	Bottom MD (ft)	Bottom TVD (ft)	Shot Density (shot/ft)	Number	Diameter (in)
2751.0	2751.0	2762.0	2762.0	6.00	66	0.32
2771.0	2771.0	2784.0	2784.0	6.00	78	0.32

Section 3: Proppant Description

Proppant				
Proppant Name	Mesh Size	Spec Gravity	Prop Fric Coeff. Laminar	Prop Fric Coeff. Turbulent
SinterLite Bauxite 16/30	16/30	3.30	1.00	0.70

Section 4: Fluid Description

Fluid Name: WF135

Additive Name	Additive Type	Solid Conc (lb/mgal)	Liquid Conc (gal/mgal)
J580, Gelling Agent	GELLINGAGT	35.0	
J218, Breaker	BREAKER	2.0	
B244B, Microbiocide	BIOCIDE		0.2
L071, Temporary Clay Stabilizer	CLAYSTABILIZ		
L065, Scale Inhibitor	INHIBITORAID		0.5

Fluid Name: WF135, [CO2 65Q]

Additive Name	Additive Type	Solid Conc (lb/mgal)	Liquid Conc (gal/mgal)
J580, Gelling Agent	GELLINGAGT	35.0	
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		
J475, EB-CLEAN Breaker	BREAKERENCAP	1.0	
L065, Scale Inhibitor	INHIBITORAID		0.5

Section 5: 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	WF135	2000		0.0	0
2	PAD	41.7	10.5	4.0	WF135 [CO2 65Q]	1750		0.0	0
3	2.0 PPA	18.1	11.8	1.5	WF135 [CO2 65Q]	630	SinterLite Bauxite 16/30	5.7	3600
4	4.0 PPA	28.3	13.0	2.2	WF135 [CO2 65Q]	840	SinterLite Bauxite 16/30	11.4	9600
5	6.0 PPA	44.4	17.7	2.5	WF135 [CO2 65Q]	1300	SinterLite Bauxite 16/30	12.0	15600
6	8.0 PPA	31.3	21.9	1.4	WF135 [CO2 65Q]	910	SinterLite Bauxite 16/30	12.3	11200
7	Flush	62.9	30.0	2.1	WF135	2641		0.0	0

Designed CO2 Pump Schedule Ramp		
Step #	Step Name	CO2 Rate (bbl/min)
1	PrePAD	0.0
2	PAD	15.9
3	2.0 PPA	14.5
4	4.0 PPA	13.6
5	6.0 PPA	10.1
6	8.0 PPA	7.1
7	Flush	0.0

Designed Ramp Totals				
Slurry (bbl)	Pump Time (min)	Clean Fluid (gal)	Proppant (lb)	CO2 (bbl)
274.4	15.3	10071	40000	149.2

Section 6: 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	48.1	0.0	3.7	WF135	2022		0.0	0.0	0
2	PAD	41.7	0.0	4.1	WF135 [CO2 65Q]	1750		0.0	0.0	0
3	2.0 PPA	18.1	0.0	1.8	WF135 [CO2 65Q]	664	SinterLite Bauxite 16/30	6.5	2.0	2621
4	4.0 PPA	28.3	0.0	2.3	WF135 [CO2 65Q]	858	SinterLite Bauxite 16/30	11.7	9.8	9064
5	6.0 PPA	44.4	0.0	3.3	WF135 [CO2 65Q]	1334	SinterLite Bauxite 16/30	17.6	9.3	14733
6	8.0 PPA	48.6	0.0	5.1	WF135 [CO2 65Q]	1580	SinterLite Bauxite 16/30	12.3	0.0	12708
7	Flush	39.3	0.0	4.3	WF135	1651	SinterLite Bauxite 16/30	0.1	0.0	42

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	0.0	19.5	0	628	427
2	PAD	0.0	19.4	0	3697	642
3	2.0 PPA	0.0	10.4	0	2290	2141
4	4.0 PPA	0.0	13.4	0	2298	1988
5	6.0 PPA	0.0	15.5	0	3016	1862

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)
6	8.0 PPA	0.0	9.5	0	2346	1886
7	Flush	0.0	9.5	0	2356	72

As Measured CO2 Pump Schedule					
Step #	Step Name	CO2 Volume (bbl)	CO2 Rate (bbl/min)	Injection Rate (bbl/min)	
1	PrePAD	9.5	0.0	0.0	
2	PAD	51.2	0.0	0.0	
3	2.0 PPA	23.5	0.0	0.0	
4	4.0 PPA	30.6	0.0	0.0	
5	6.0 PPA	30.9	0.0	0.0	
6	8.0 PPA	46.3	0.0	0.0	
7	Flush	29.1	0.0	0.0	

As Measured Totals			
Slurry (bbl)	Pump Time (min)	Clean Fluid (gal)	Proppant (lb)
268.6	24.7	9860	39167

Average Treating Pressure: 0 psi ~ 2400
 Maximum Treating Pressure: 3697 psi
 Minimum Treating Pressure: 72 psi
 Average Injection Rate: 0.0 bbl/min
 Maximum Injection Rate: 28.8 bbl/min
 Average Horsepower: 0.0 hhp
 Maximum Horsepower: 1216.1 hhp
 Maximum Prop Concentration: 17.6 PPA

Section 7: Material Balance

Material Balance	
Material Name	Quantity Pumped
WF135	3673 gal
WF135 [CO2 65Q]	6187 gal
SinterLite Bauxite 16/30	39167 lb
J580, Gelling Agent	400 lb
J218, Breaker	22 lb
B244B, Microbiocide	5 gal
L071, Temporary Clay Stabilizer	10 gal
L065, Scale Inhibitor	5 gal
F109, Foaming Agent	20 gal
F112, EZEFL0 Surfactant	8 gal
J475, EB-CLEAN Breaker	27 lb
CO2	221.0 bbl

Section 8: Job Messages

Message Log							
#	Time	Message	Treating Pressure (psi)	Annulus Pressure (psi)	Total Slurry (bbl)	Slurry Rate (bbl/min)	Prop. Conc. (PPA)
1	13:59:13	Prime Up SPF-26339	249	-3750	0.0	6.3	0.0
2	14:01:12	Prime Up SPF37974	253	-3750	0.0	5.1	0.0
3	14:07:19	Set Brakes	158	-3750	0.0	1.8	0.0
4	14:07:32	Knock Off Prime Up Hose	155	-3750	0.0	0.0	0.0
5	14:08:57	Releaseing Brakes	156	-3750	0.0	0.0	0.0
6	14:09:45	Low PSI Test	2402	-3750	0.0	0.0	0.0
7	14:10:33	High PSI Test	5061	-3750	0.0	0.2	0.0
8	14:10:54	Pressure Test Lines	4990	-3750	0.0	0.0	0.0
9	14:11:02	Pressure Test Ok	4981	-3750	0.0	0.0	0.0
10	14:11:39	Bleed Off lines	4963	-3750	0.0	0.0	0.0
11	14:12:46	Open Wellhead	564	-3750	0.0	0.0	0.0
12	14:13:28	Start PrePAD Automatically	564	-3750	0.0	0.0	0.0
13	14:13:28	Start Propped Frac Automatically	564	-3750	0.0	0.0	0.0
14	14:13:28	Start Stage 1 Automatically	564	-3750	0.0	0.0	0.0
15	14:13:28	Started Pumping	564	-3750	0.0	0.0	0.0
16	14:14:05	Activated Extend Stage	560	-3750	0.0	1.5	0.0
17	14:17:45	Deactivated Extend Stage	738	-3750	48.1	19.5	0.0
18	14:17:45	Start PAD Manually	738	-3750	48.1	19.5	0.0
19	14:18:42	Stage at Perfs: PrePAD	2664	-3750	60.2	9.5	0.0
20	14:21:02	Stage at Perfs: PAD	2315	-3750	82.0	9.3	0.0
21	14:21:53	Start 2.0 PPA Automatically	2270	-3750	89.9	9.3	0.0
22	14:21:53	Started Pumping Prop	2270	-3750	89.9	9.3	0.0
23	14:23:41	Start 4.0 PPA Automatically	2130	-3750	108.0	10.2	5.7
24	14:25:03	Stage at Perfs: 2.0 PPA	2005	-3750	124.3	12.1	11.4
25	14:26:02	Start 6.0 PPA Automatically	2327	-3750	136.4	14.3	9.8
26	14:26:46	Stage at Perfs: 4.0 PPA	2323	-3750	147.1	15.5	11.4
27	14:29:25	Start 8.0 PPA Automatically	2312	-3750	180.8	9.5	0.0
28	14:29:29	Stage at Perfs: 6.0 PPA	2277	-3750	181.4	9.5	0.0
29	14:30:04	Activated Extend Stage	2135	-3750	186.9	9.5	5.8
30	14:33:38	Stage at Perfs: 8.0 PPA	1920	-3750	220.7	9.5	9.1
31	14:34:32	Deactivated Extend Stage	1941	-3750	229.3	9.5	0.1
32	14:34:32	Start Flush Manually	1941	-3750	229.3	9.5	0.1
33	14:39:01	Shutdown - ISIP	1915	-3750	267.7	0.0	0.0
34	14:44:01	5 MIN	1271	-3750	267.7	0.0	0.0
35	14:47:50	Stopped Pumping Prop	1062	-3750	267.7	0.0	-0.2
36	14:49:05	10 MIN	1003	-3750	267.7	0.0	0.0
37	14:54:12	15 MIN	808	-3750	267.7	0.0	0.0
38	14:56:27	Close Wellhead	770	-3750	267.7	0.0	0.0

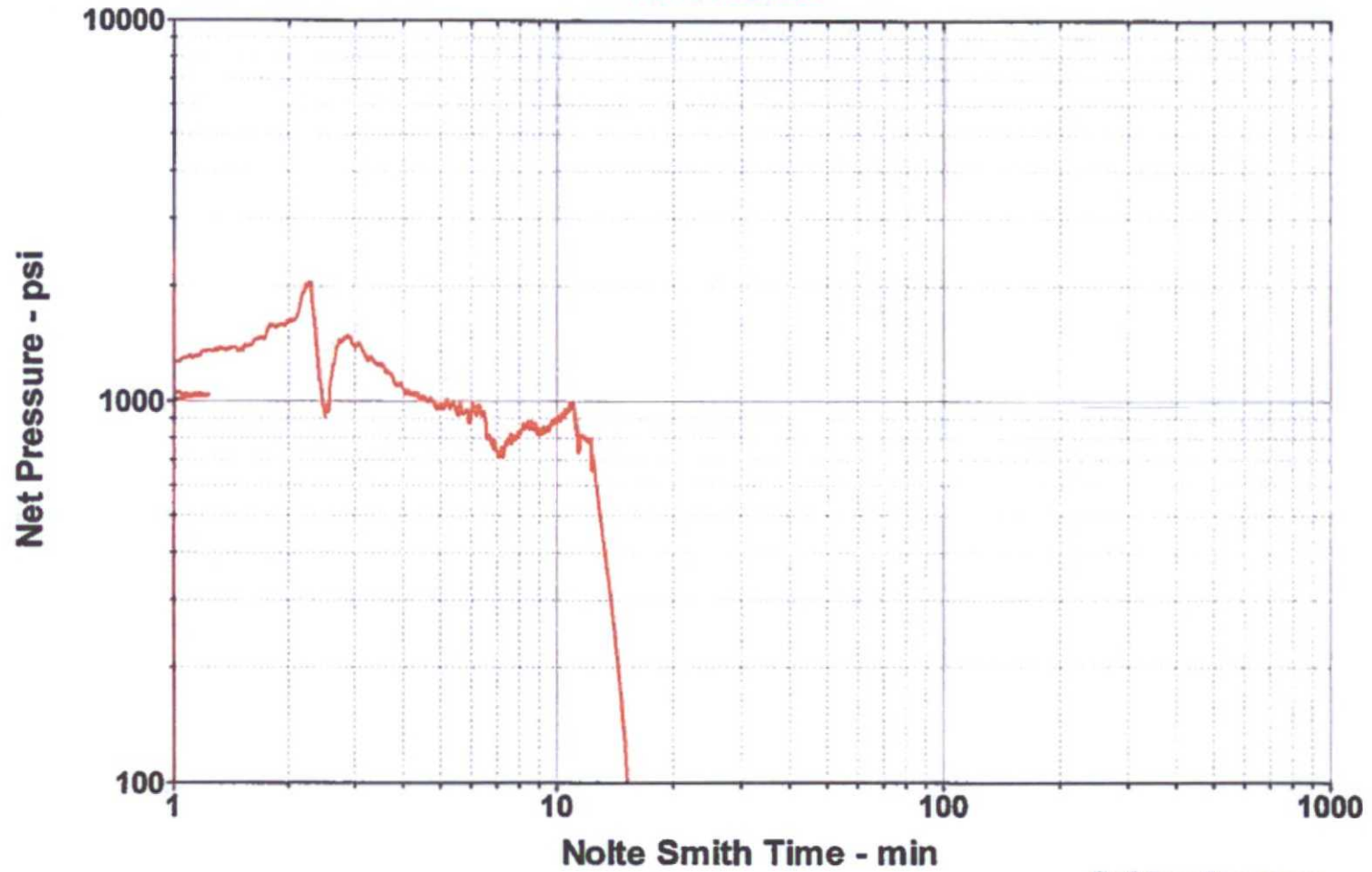
FracCAT*

Closure Pressure = 2500 psi

Whiting
Lewis 1928 #2-1
06-03-2014

Nolte Smith Post Job Plot

— Net Pressure



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PRC Post Job Plot

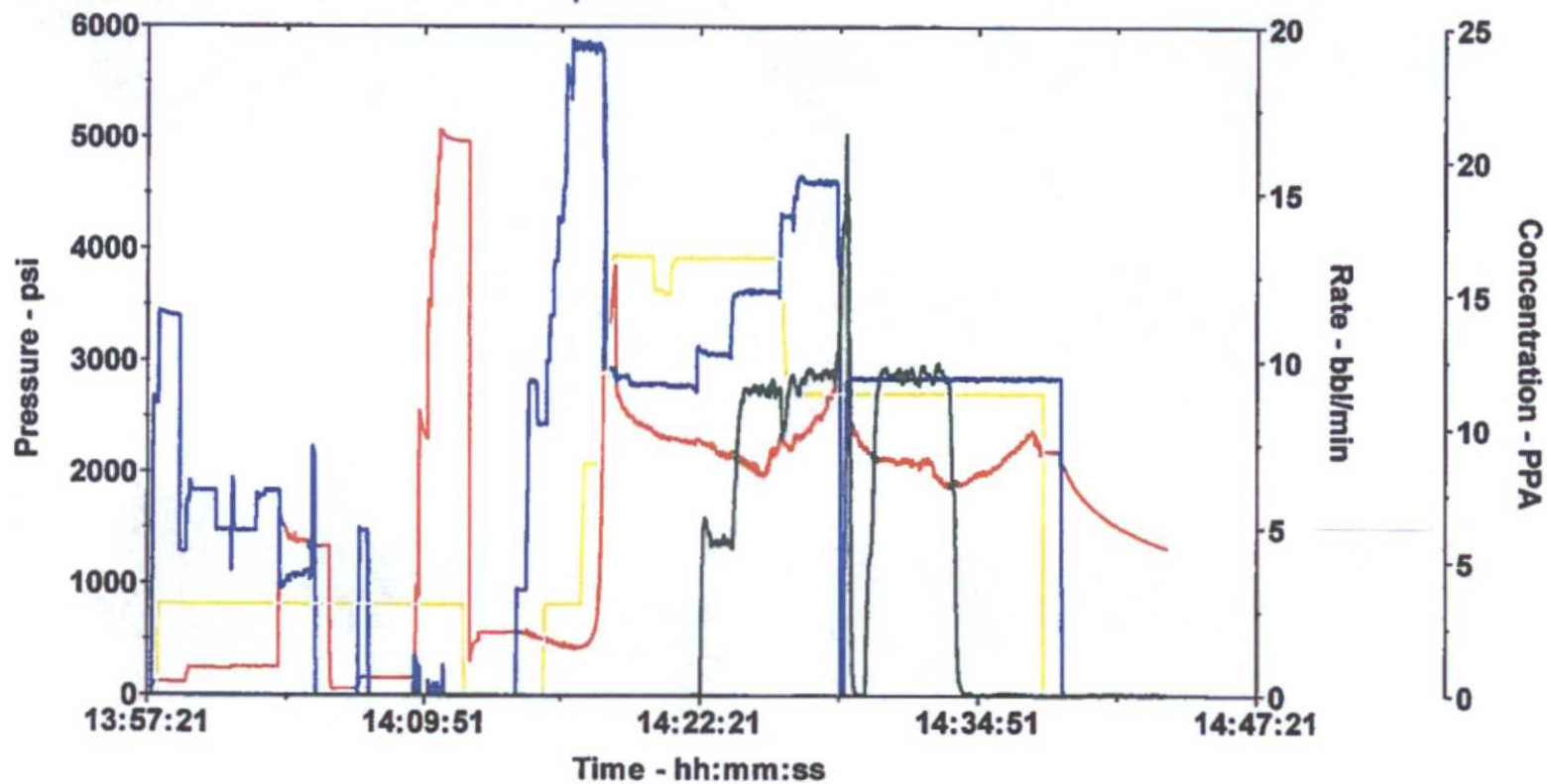
— Tr. Press

— Slurry Rate

— CO2_RATE

— Prop Con

Whiting
Lewis 1928 #2-1
06-03-2014



Stimulation Service Report

Well		Location (legal)		Schlumberger Location		Job Start	
Lewis 1928 #2-1				H088S		Apr/07/2014	
Field		Formation Name/Type		Deviation		Well MD	
Bravo Dome, west		Tebb		deg		2975.0 h	
County		State/Province		BHP		Well TVD	
Harding		new mexico		500 psi		5000.0 h	
Well Master		APU/UWI		BHST		BHCT	
30-021-20588				89 degF		degF	
Well Master		APU/UWI		500 psi		0.218 psi/ft	
Rig Name		Drilled For		Service Via		Casing/Liner	
		Oil		Lead			
Offshore Zone		Well Class		Well Type		Depth, ft	
		New		Rigless		Size, in	
						Weight, lb/ft	
						Grade	
						Thread	
Primary Treating Fluid		Polymer Loading		Fluid Density		T/D	
WF135 [C02 650]		35.0 lb/mgal		8.44 lb/gal		Depth, ft	
						Size, in	
						Weight, lb/ft	
						Grade	
						Thread	
Service Line		Job Type		T/D		Depth, ft	
Fracturing		Frac, C02 > 53% (223)				Size, in	
						Weight, lb/ft	
						Grade	
						Thread	
Max. Allowed Tub. Press		Max. Allowed Ann. Press		WH Connection		T/D	
psi		4000 psi		Frac Stack		Depth, ft	
						Size, in	
						Weight, lb/ft	
						Grade	
						Thread	
Service Instructions				Top, ft		Bottom, ft	
				2751.0 ft		2762.0 ft	
				2771.0 ft		2784.0 ft	
				2016.0 ft		2023.0 ft	
				Treat Down		Displacement	
				Casing		63.0 bbl	
				Packer Type		Packer Depth	
						0.0 ft	
Job Scheduled For		Arrived on Location		Leave Location		Tubing Vol.	
Apr/07/2014		Apr/07/2014		Apr/07/2014		0.0 bbl	
						Casing Vol.	
						68.5 bbl	
						Annular Vol.	
						bbl	
						Openhole Vol.	
						bbl	

Date	Time 24-hr Clock	Testing Pressure PSI	Slurry Rate B/M	Proppant Concentration PPAD	Message
06/03/2014	13:57:21	58	0.0	0.0	
06/03/2014	13:59:13	249	6.3	0.0	Prime Up SPF-26139
06/03/2014	14:01:12	253	5.1	0.0	Prime Up SPF37974
06/03/2014	14:02:21	252	6.0	0.0	
06/03/2014	14:07:19	158	1.8	0.0	Set Brakes
06/03/2014	14:07:21	158	0.0	0.0	
06/03/2014	14:07:32	155	0.0	0.0	Knock Off Prime Up Hose
06/03/2014	14:08:57	156	0.0	0.0	Releasing Brakes
06/03/2014	14:09:45	2402	0.0	0.0	Low PSI Test
06/03/2014	14:10:33	5061	0.2	0.0	High PSI Test
06/03/2014	14:10:54	4990	0.0	0.0	Pressure Test Lines
06/03/2014	14:11:02	4981	0.0	0.0	Pressure Test Ok
06/03/2014	14:11:39	4963	0.0	0.0	Bleed Off Lines
06/03/2014	14:12:21	563	0.0	0.0	
06/03/2014	14:12:46	564	0.0	0.0	Open Wellhead
06/03/2014	14:13:28	564	0.0	0.0	Start PrePAD Automatically
06/03/2014	14:14:05	560	1.5	0.0	Activated Extend Stage
06/03/2014	14:17:21	478	19.4	0.0	
06/03/2014	14:17:45	738	19.5	0.0	Deactivated Extend Stage
06/03/2014	14:18:42	2664	9.5	0.0	Stage at Perfs: PrePAD
06/03/2014	14:21:02	2315	9.3	0.0	Stage at Perfs: PAD
06/03/2014	14:21:53	2270	9.3	0.0	Start 2.0 PPA Automatically
06/03/2014	14:22:21	2280	10.3	0.1	
06/03/2014	14:23:41	2130	10.2	5.7	Start 4.0 PPA Automatically
06/03/2014	14:25:03	2005	12.1	11.4	Stage at Perfs: 2.0 PPA

Date	Time 24-hr (clock)	Treating Pressure PSI	Slurry Rate B/M	Proppant Concentration PPAC	Message
06/03/2014	14:26:02	2327	14.3	9.8	Start 6.0 PPA Automatically
06/03/2014	14:26:46	2323	15.5	11.4	Stage at Perfs: 4.0 PPA
06/03/2014	14:27:21	2436	15.3	12.1	
06/03/2014	14:29:25	2312	9.5	0.0	Start 8.0 PPA Automatically
06/03/2014	14:29:29	2277	9.5	0.0	Stage at Perfs: 6.0 PPA
06/03/2014	14:30:04	2135	9.5	5.8	Activated Extend Stage
06/03/2014	14:32:21	2126	9.5	12.3	
06/03/2014	14:33:38	1920	9.5	9.1	Stage at Perfs: 8.0 PPA
06/03/2014	14:34:32	1941	9.5	0.1	Deactivated Extend Stage
06/03/2014	14:37:21	2345	9.5	0.0	
06/03/2014	14:39:01	1915	0.0	0.0	Shutdown - ISIP
06/03/2014	14:42:21	1391	0.0	-0.0	
06/03/2014	14:44:01	1271	0.0	0.0	5 MIN
06/03/2014	14:47:21	1384	0.0	-0.2	
06/03/2014	14:47:50	1062	0.0	-0.2	Stopped Pumping Prop
06/03/2014	14:49:05	1003	0.0	0.0	10 MIN
06/03/2014	14:52:21	871	0.0	0.0	
06/03/2014	14:54:12	806	0.0	0.0	15 MIN
06/03/2014	14:56:27	770	0.0	0.0	Close Wellhead
06/03/2014	14:57:21	429	0.0	0.0	

Post Job Summary

Average Injection Rates, bbl/min				Volume of Fluid Injected, bbl			
Slurry	N2	CO2	Maximum Rate	Clean Fluid	Acid	Oil	CO2
0.0	0	0.0	28.8	234.8	0.0	0.0	221.0
Treating Pressure Summary, psi				Quantity of 14/30 SinterLite Beads 14/30 placed in			
Breakdown	Maximum	Final	Average	ISIP	15 Min. ISIP	Total Injected	Total Ordered/Designed
3850	3697	-3791	1941	1915	808	39167	40000
N2 Percent	CO2 Percent	Designed Fluid Volume	Displacement	Slurry Volume	Prod Volume	Percent Prod	
%	%	5430 gal	39.3 bbl	288.6 bbl	3772 gal	33.4 %	
Customer or Authorized Representative		Schlumberger Supervisor		Number of Stages	Fracture Gradient	Job Completed	☒
Robert McNaughton		Daniel Carrillo		7	0.735 psi/ft	Displacement	☐