



FracCAT Treatment Report

Well : State 2229 #36-1
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 : 07/02/2014

Prepared by

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Service Point : HOBBS
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Comments : Stage 1

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Section 1: Well Description

Deviated Hole: NO
 Treating Down: CASING
 Flush Volume to 988.4 ft is 61.8 bbl

Casing			
OD (in)	Weight (lb/ft)	ID (in)	Depth (ft)
9.625	36.0	8.921	716.0
5.500	15.5	4.950	2750.0

Section 2: Perforations

Perforations						
Top MD (ft)	Top TVD (ft)	Bottom MD (ft)	Bottom TVD (ft)	Shot Density (shot/ft)	Number	Diameter (in)
2598.0	2598.0	2609.0	2609.0	6.00	66	0.32
2617.0	2617.0	2639.0	2639.0	6.00	132	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: 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, Microbicide	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, EZEFL0 Surfactant	SURFACTANT		2.0
B244B, Microbicide	BIOCIDE		0.2
L071, Temporary Clay Stabilizer	CLAYSTABILIZ		1.0
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)
1	PrePAD	47.6	30.0	1.6	WF140	2000		0.0
2	PAD	41.7	10.5	4.0	WF140 [CO2 65Q]	1750		0.0
3	2.0 PPA	21.1	11.8	1.8	WF140 [CO2 65Q]	735	SinterLite Bauxite 16/30	5.7
4	4.0 PPA	30.7	13.0	2.4	WF140 [CO2 65Q]	910	SinterLite Bauxite 16/30	11.4
5	6.0 PPA	49.6	17.7	2.8	WF140 [CO2 65Q]	1450	SinterLite Bauxite 16/30	12.0
6	8.0 PPA	22.4	21.9	1.0	WF140 [CO2 65Q]	650	SinterLite Bauxite 16/30	12.3
7	Flush	61.8	30.0	2.1	WF140	2597		0.0

Designed CO2 Pump Schedule Ramp		
Step #	Step Name	CO2 Rate (bbl/min)
1	PrePAD	0.0
2	PAD	15.3
3	2.0 PPA	14.2
4	4.0 PPA	13.3
5	6.0 PPA	9.9
6	8.0 PPA	6.9
7	Flush	0.0

Designed Ramp Totals				
Slurry (bbl)	Pump Time (min)	Clean Fluid (gal)	Proppant (lb)	CO2 (bbl)
274.9	15.6	10092	40000	152.4

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	85.2	16.3	6.5	WF140	3574		0.0	0.0	0
2	PAD	41.7	11.4	4.0	WF140 [CO2 65Q]	1757		0.0	0.0	0
3	2.0 PPA	21.1	10.2	2.1	WF140 [CO2 65Q]	750	SinterLite Bauxite 16/30	5.8	2.6	3727
4	4.0 PPA	30.7	11.4	2.7	WF140 [CO2 65Q]	926	SinterLite Bauxite 16/30	11.7	1.1	9851
5	6.0 PPA	49.6	15.3	3.2	WF140 [CO2 65Q]	1458	SinterLite Bauxite 16/30	12.1	8.2	17120
6	8.0 PPA	28.9	18.6	1.5	WF140 [CO2 65Q]	936	SinterLite Bauxite 16/30	12.6	0.0	7687
7	Flush	59.6	17.7	4.0	WF140	2515	SinterLite Bauxite 16/30	0.2	0.0	34

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	16.3	19.2	1083	1970	17
2	PAD	11.4	19.1	1742	1807	1653
3	2.0 PPA	10.2	10.7	1830	1856	1802
4	4.0 PPA	11.4	14.6	1778	1822	1739
5	6.0 PPA	15.3	16.2	1688	1770	1575

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	18.6	19.0	1605	1644	1541
7	Flush	17.7	19.1	1565	1903	4

As Measured CO ₂ Pump Schedule				
Step #	Step Name	CO ₂ Volume (bbl)	CO ₂ Rate (bbl/min)	Injection Rate (bbl/min)
1	PrePAD	21.5	3.7	20.0
2	PAD	47.6	11.1	22.4
3	2.0 PPA	26.0	12.6	22.9
4	4.0 PPA	32.7	12.3	23.6
5	6.0 PPA	30.0	9.3	24.6
6	8.0 PPA	10.2	6.6	25.2
7	Flush	15.3	6.2	22.7

As Measured Totals			
Slurry (bbl)	Pump Time (min)	Clean Fluid (gal)	Proppant (lb)
316.7	24.0	11914	38419

Average Treating Pressure: 1522 psi
 Maximum Treating Pressure: 1970 psi
 Minimum Treating Pressure: 4 psi
 Average Injection Rate: 22.6 bbl/min
 Maximum Injection Rate: 25.7 bbl/min
 Average Horsepower: 560.8 hhp
 Maximum Horsepower: 886.5 hhp
 Maximum Prop Concentration: 12.6 PPA

Section 7: Material Balance

Material Balance	
Material Name	Quantity Pumped
WF140	6088 gal
WF140 [CO ₂ 65Q]	5826 gal
SinterLite Bauxite 16/30	38419 lb
J580, Gelling Agent	500 lb
J218, Breaker	55 lb
B244B, Microbiocide	3 gal
L071, Temporary Clay Stabilizer	15 gal
L065, Scale Inhibitor	5 gal
F109, Foaming Agent	25 gal
F112, EZEFL0 Surfactant	12 gal
J475, EB-CLEAN Breaker	55 lb
CO ₂	183.2 bbl

Section 8: Job Messages

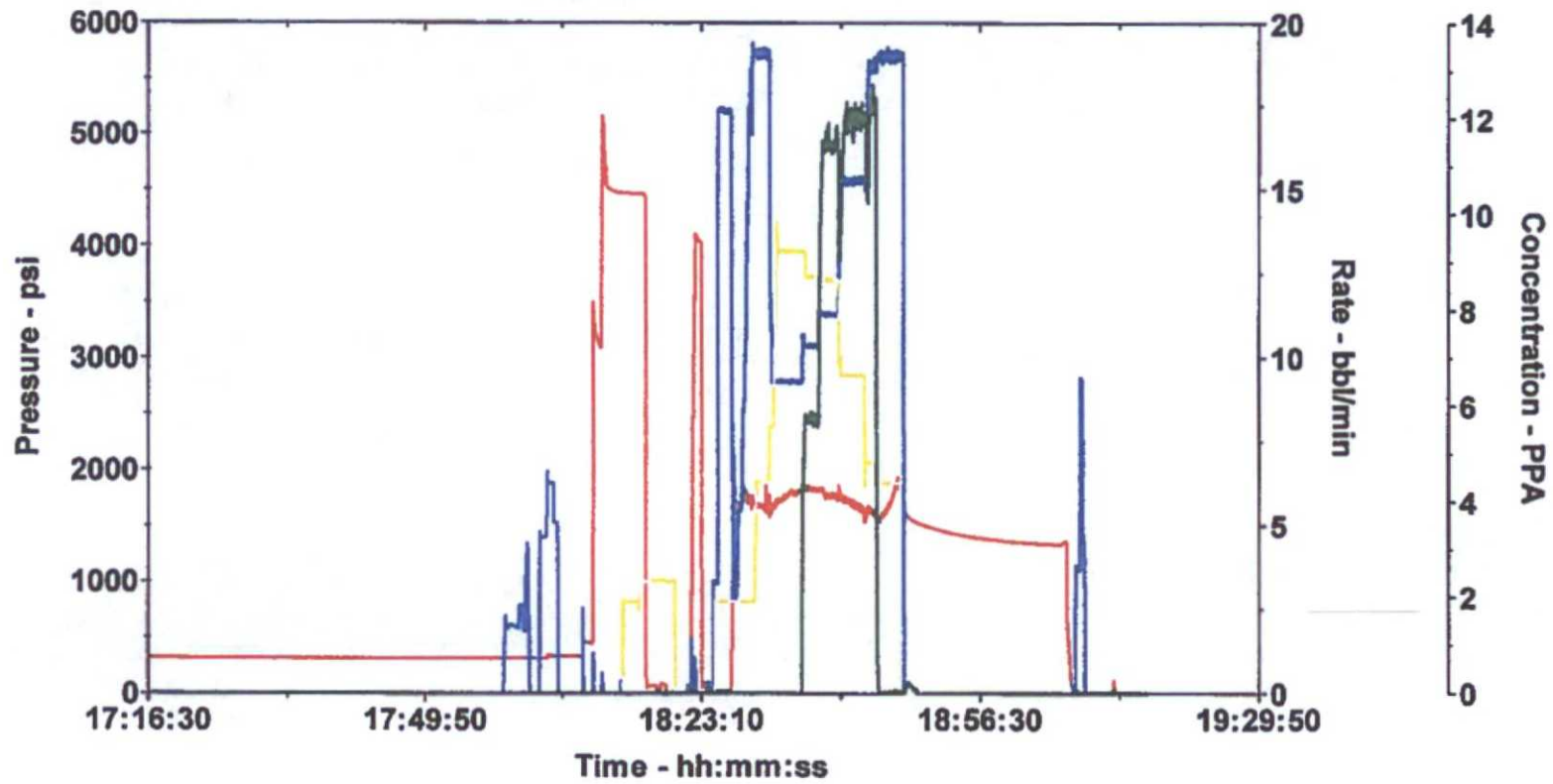
Message Log							
#	Time	Message	Treating Pressure (psi)	Annulus Pressure (psi)	Total Slurry (bbl)	Slurry Rate (bbl/min)	Prop. Conc. (PPA)
1	16:33:58	Prime Up SPF-37974	297	-3750	0.0	6.2	0.0
2	16:37:44	Waiting 3rd Party	322	-3750	0.0	0.0	0.0
3	18:03:23	Prime Up SPF-26339	308	-3750	0.0	0.0	0.0
4	18:07:57	Knock Off Prime Up Hose	328	-3750	0.0	0.0	0.0
5	18:08:25	Clear Area	327	-3750	0.0	0.0	0.0
6	18:10:33	Low PSI Test	3209	-3750	0.0	0.0	0.0
7	18:11:33	High PSI Test	4732	-3750	0.0	0.0	0.0
8	18:12:25	Pressure Test Ok	4494	-3750	0.0	0.0	0.0
9	18:16:47	Bleed Off lines	65	-3750	0.0	0.0	0.0
10	18:17:24	Open Wellhead	66	-3750	0.0	0.0	0.0
11	18:23:54	Start PrePAD Automatically	16	-3750	0.0	0.0	0.0
12	18:23:54	Start Propped Frac Automatically	16	-3750	0.0	0.0	0.0
13	18:23:54	Start Stage 1 Automatically	16	-3750	0.0	0.0	0.0
14	18:23:54	Started Pumping	16	-3750	0.0	0.0	0.0
15	18:24:00	Activated Extend Stage	19	-3750	0.0	0.0	0.0
16	18:30:55	Deactivated Extend Stage	1710	-3750	85.2	19.0	0.0
17	18:30:55	Start PAD Manually	1710	-3750	85.2	19.0	0.0
18	18:31:22	Stage at Perfs: PrePAD	1663	-3750	93.1	11.9	0.0
19	18:34:58	Start 2.0 PPA Automatically	1804	-3750	126.9	9.3	0.0
20	18:34:58	Started Pumping Prop	1804	-3750	126.9	9.3	0.0
21	18:35:55	Stage at Perfs: PAD	1857	-3750	136.5	10.3	5.7
22	18:37:02	Start 4.0 PPA Automatically	1809	-3750	148.1	10.4	5.6
23	18:39:42	Start 6.0 PPA Automatically	1813	-3750	178.6	14.7	9.0
24	18:39:46	Stage at Perfs: 2.0 PPA	1756	-3750	179.6	15.1	9.6
25	18:41:43	Stage at Perfs: 4.0 PPA	1671	-3750	209.4	15.3	12.0
26	18:42:57	Start 8.0 PPA Automatically	1626	-3750	228.4	17.1	11.0
27	18:43:18	Activated Extend Stage	1616	-3750	234.8	18.8	12.1
28	18:44:18	Stage at Perfs: 6.0 PPA	1537	-3750	253.6	18.9	0.2
29	18:44:29	Deactivated Extend Stage	1569	-3750	257.1	19.0	-0.0
30	18:44:29	Start Flush Manually	1569	-3750	257.1	19.0	-0.0
31	18:49:26	Shutdown - ISIP	1508	-3750	310.9	0.0	-0.1
32	18:49:38	Stopped Pumping Prop	1503	-3750	310.9	0.0	-0.1
33	18:54:38	5MIN	1407	-3750	310.9	0.0	0.0
34	18:59:38	10 MIN	1360	-3750	310.9	0.0	0.0
35	19:05:06	15 Min	1330	-3750	310.9	0.0	0.0
36	19:07:29	Bleed Off lines	56	-3750	310.9	0.0	0.0

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PRC Post Job Plot

Tr. Press Slurry Rate CO2_RATE
Prop Con

Whiting Petroleum Corporation
State 2229 #36-1
06-02-2014



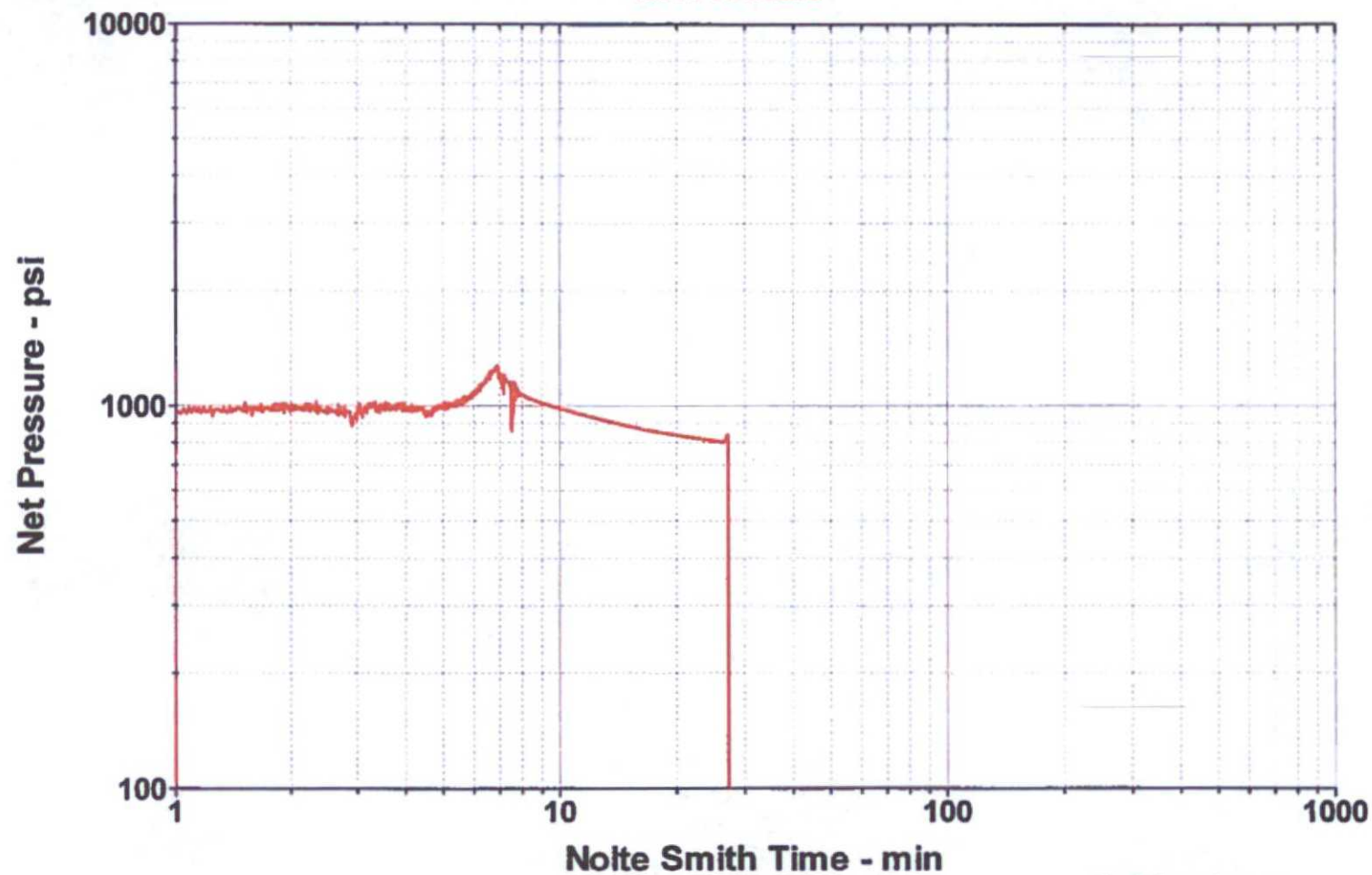
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Closure Pressure = 1924 psi

Whiting Petroleum Corporation
State 2229 #36-1
06-02-2014

Nolte Smith Post Job Plot

— Net Pressure



Well		Location (lego)		Customer Whiting Petroleum Corporation		Job Number CFX-00068	
State 2229 #36-1		Schlumberger Location HOBBS		Job Start Apr/07/2014			
Field Bravo Dome, west	Formation Name/Type Tubb	Deviation deg	Bk Size 7.38 in	Well MD 3000.0 ft	Well TVD 5000.0 ft		
County Herdin	State/Province new mexico	BHP 600 psi	BHST 89 degF	BHCT degF	Pore Press. Gradient 0.231 psi/ft		
Well Master 30-021-20598	API/UWI						
Rig Name	Drilled For Oil	Service Via Land	Casing/Liner				
Onshore Zone	Well Class New	Well Type Rigless	Depth, ft	Size, in	Weight, lb/ft	Grade	Thread
			2750.0	5.500	15.5	J55	
			718.0	9.625	36.0	J55	
Primary Treating Fluid WF140 [CO2 65Q]	Polymer Loading 35.0 lb/mgal	Fluid Density 8.44 lb/gal	Tubing/Drill Pipe				
			T/D	Depth, ft	Size, in	Weight, lb/ft	Grade
Service Line Fracturing	Job Type		Perforations/Open Hole				
Max. Allowed Tub. Press psi	Max. Allowed Ann. Press psi	WH Connection Frac Head	Top, ft	Bottom, ft	shot/ft	No. of Shots	Total Interval
			2598.0 ft	2609.0 ft	8.00	66	40.0 ft
			2617.0 ft	2639.0 ft	6.00	132	Diameter
			2016.0 ft	2023.0 ft	6.00	42	0.32 in
			Treat Down Casing	Displacement 47.0 bbl	Packer Type	Packer Depth 0.0 ft	
Job Scheduled For Apr/07/2014	Arrived on Location Apr/07/2014	Leave Location Apr/07/2014	Tubing Vol. 0.0 bbl	Casing Vol. 55.4 bbl	Annular Vol. bbl	Openhole Vol. bbl	

Date	Time 24-hr clock	Treating Pressure PSI	Slurry Rate GPM	Proppant Concentration PPAC	Message
06/02/2014	16:25:15	3	0.0	0.0	
06/02/2014	16:30:15	301	6.2	0.0	
06/02/2014	16:33:58	297	6.2	0.0	Prime Up SPF-37974
06/02/2014	16:25:15	324	5.0	0.0	
06/02/2014	16:37:44	322	0.0	0.0	Waiting 3rd Party
06/02/2014	16:40:15	323	0.0	0.0	
06/02/2014	16:45:15	322	0.0	0.0	
06/02/2014	16:50:15	321	0.0	0.0	
06/02/2014	16:55:15	320	0.0	0.0	
06/02/2014	17:00:15	320	0.0	0.0	
06/02/2014	17:05:15	318	0.0	0.0	
06/02/2014	17:10:15	318	0.0	0.0	
06/02/2014	17:15:15	316	0.0	0.0	
06/02/2014	17:20:15	315	0.0	0.0	
06/02/2014	17:25:15	314	0.0	0.0	
06/02/2014	17:30:15	312	0.0	0.0	
06/02/2014	17:35:15	310	0.0	0.0	
06/02/2014	17:40:15	310	0.0	0.0	
06/02/2014	17:45:15	311	0.0	0.0	
06/02/2014	17:50:15	309	0.0	0.0	
06/02/2014	17:55:15	311	0.0	0.0	
06/02/2014	18:00:15	309	2.0	0.0	
06/02/2014	18:03:23	308	0.0	0.0	Prime Up SPF-26339
06/02/2014	18:05:15	330	6.2	0.0	
06/02/2014	18:07:57	328	0.0	0.0	Knock Off Prime Up Hose

Date	Time 24-hr (clock)	Testing Pressure PSI	Slurry Rate B/M	Proppant Concentration PPAC	Message
06/02/2014	18:08:25	327	0.0	0.0	Clear Area
06/02/2014	18:10:15	3394	0.0	0.0	
06/02/2014	18:10:33	3209	0.0	0.0	Low PSI Test
06/02/2014	18:11:33	4732	0.0	0.0	High PSI Test
06/02/2014	18:12:25	4494	0.0	0.0	Pressure Test OK
06/02/2014	18:15:15	4482	0.0	0.0	
06/02/2014	18:16:47	65	0.0	0.0	Bleed Off lines
06/02/2014	18:17:24	66	0.0	0.0	Open Wellhead
06/02/2014	18:20:15	5	0.0	0.0	
06/02/2014	18:23:54	16	0.0	0.0	Start PrePAD Automatically
06/02/2014	18:24:00	19	0.0	0.0	Activated Extend Stage
06/02/2014	18:25:15	16	17.3	0.0	
06/02/2014	18:30:15	1670	19.0	0.0	
06/02/2014	18:30:55	1710	19.0	0.0	Deactivated Extend Stage
06/02/2014	18:31:22	1663	11.9	0.0	Stage at Perfs: PrePAD
06/02/2014	18:34:58	1804	9.3	0.0	Start 2.0 PPA Automatically
06/02/2014	18:35:15	1856	10.7	4.3	
06/02/2014	18:35:55	1857	10.3	5.7	Stage at Perfs: PAD
06/02/2014	18:37:02	1809	10.4	5.6	Start 4.0 PPA Automatically
06/02/2014	18:39:42	1813	14.7	9.0	Start 6.0 PPA Automatically
06/02/2014	18:39:46	1756	15.1	9.6	Stage at Perfs: 2.0 PPA
06/02/2014	18:40:15	1727	15.2	12.0	
06/02/2014	18:41:43	1671	15.3	12.0	Stage at Perfs: 4.0 PPA
06/02/2014	18:42:57	1628	17.1	11.0	Start 6.0 PPA Automatically
06/02/2014	18:43:18	1618	18.8	12.1	Activated Extend Stage
06/02/2014	18:44:18	1537	18.9	0.2	Stage at Perfs: 6.0 PPA
06/02/2014	18:44:29	1569	19.0	-0.0	Deactivated Extend Stage
06/02/2014	18:45:15	1624	19.0	-0.0	
06/02/2014	18:49:26	1508	0.0	-0.1	Shutdown - ISIP
06/02/2014	18:49:38	1503	0.0	-0.1	Stopped Pumping Prop
06/02/2014	18:50:15	1483	0.0	0.0	
06/02/2014	18:54:38	1407	0.0	0.0	5 MIN
06/02/2014	18:55:15	1399	0.0	0.0	
06/02/2014	18:59:38	1360	0.0	0.0	10 MIN
06/02/2014	19:00:15	1356	0.0	0.0	
06/02/2014	19:05:06	1330	0.0	0.0	15 Min
06/02/2014	19:05:15	1330	0.0	0.0	
06/02/2014	19:07:29	56	0.0	0.0	Bleed Off lines
06/02/2014	19:10:15	6	0.0	0.0	
06/02/2014	19:15:15	-3798	0.0	0.0	
06/02/2014	19:20:15	-3799	0.0	0.0	
06/02/2014	19:25:15	-3798	0.0	0.0	
06/02/2014	19:30:15	-3795	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	D#	CO2	N2
22.6	0	7.8	25.7	283.7	0.0	0.0	183.2	0.0
Testing Pressure Summary, psi					Quantity of 14/30 SinterLike Beads 14/30 placed in			
Breakdown	Maximum	Final	Average	ISIP	15 Min. ISIP	Total Injected		Total Ordered/Designed
2244	1970	-3799	1708	1508	1330	38419		40000
N2 Percent		CO2 Percent	Designed Fluid Volume	Displacement	Slurry Volume		Pad Volume	Percent Pad

%	65.0 %	5495 gal	59.6 bbl	318.7 bbl	5327 gal	40.1 %
Customer or Authorized Representative		Schlumberger Supervisor		Number of Stages	Fracture Gradient	Job Completed ☒
Robert McNaughton		Daniel Carrillo		7	0.810 psi/ft	Displacement ☐