

Well Information**Cockroft 34-11 Niobrara Recomplete**

Well Name: Cockroft Well #: 34-11

Tubulars

Name	Measured Depth (ft)	Outer Diameter (in)	Inner Diameter (in)	Linear Weight (lbm/ft)
4 1/2" Production Casing	0 - 7000	4.5	4	11.6

Perforations

Interval Name/ Depth (ft)	Shot Density (spf)	# of Perfs	Phase (DEG)	Hole Diam. (in)	Mid-perf Depth (ft)
Niobrara B Perforation Interval / 6692 - 6700	3	24	120	0.42	6696
Niobrara A Perforation Interval / 6586 - 6588	2	4	120	0.42	6587

Formations

Name	Top MD (ft)	Bottom MD (ft)	Top TVD (ft)	Bottom TVD (ft)
Niobrara Formation	6586	6700	6586	6700

Job Fluids Summary

Cockroft 34-11 Niobrara Recomplete

pHaserFrac w/ ClaWeb						
Volume	Base Fluid	Clay Control	Surfactant	Catalyst	Breaker	Surfactant
99000 (Gal)	Fresh Water*	CLA-Web	Gasperm 1100	CAT-3	Vicon NF	Losurf-300D
Totals	99000 (Gal)	24.75 (Gal)	148.5 (Gal)	18.5 (Gal)	179 (Gal)	99 (Gal)

PDC Acitve Fluid Pad					
Volume	Base Fluid	Breaker	Clay Control	Surfactant	Surfactant
5000 (Gal)	Fresh Water*	Vicon NF	CLA-Web	Gasperm 1100	Losurf-300D
Totals	5000 (Gal)	50 (Gal)	1.25 (Gal)	50 (Gal)	5 (Gal)

FR-66 Water				
Volume	Base Fluid	Surfactant	Surfactant	Clay Control
65000 (Gal)	Fresh Water*	Gasperm 1100	Losurf-300D	CLA-Web
Totals	65000 (Gal)	97.5 (Gal)	65 (Gal)	16.25 (Gal)

Treated Water		
Volume	Base Fluid	Clay Control
5000 (Gal)	Fresh Water*	CLA-Web
Totals	5000 (Gal)	1.25 (Gal)

JOB TOTALS						
Volume (Gal)	Base Fluid (Gal)	Clay Control (Gal)	Surfactant (Gal)	Catalyst (Gal)	Breaker (Gal)	Surfactant (Gal)
	Fresh Water*	CLA-Web	Gasperm 1100	CAT-3	Vicon NF	Losurf-300D
	174000	43.5	296	18.5	229	169

Proppant		
	Designed Qty	Requested
CRC-20/40	12000 (lbm)	12000 (lbm)
Premium White-20/40	238000 (lbm)	238000 (lbm)

Customer Supplied Items *			
	Designed Qty	Tank Bottom	Requested w/ Tank Bottom
Fresh Water	174000 Gal	0 Gal	174000 Gal

Treatment 1

Cockroft 34-11 Niobrara Recomplete

Well Name	Cockroft	PDC Acitve Fluid Pad	5000 Gal
Job Name	Cockroft 34-11 Niobrara Recomplete	FR-66 Water	65000 Gal
No. of Perfs/Jets	28	pHaserFrac w/ ClaWeb	99000 Gal
Mid Perf Depth	6368.5 ft	Treated Water	5000 Gal
Estimated Pump Time	1.63 hrs	Premium White-20/40	238000 lbm
BHST	230 degF	CRC-20/40	12000 lbm
Frac Gradient	0.89 psi/ft		

Casing (Surface)								
Trt-Stage	Stage Desc.	Flow Path	Fluid Desc.	Rate-Liq+Prop	Clean Vol.	Proppant	Proppant Conc.	Prop. Mass
1-1	Pad	IN	PDC Acitve Fluid Pad	10	5000		0	0
1-2	Pad	IN	FR-66 Water	50	65000		0	0
1-3	Pad	IN	pHaserFrac w/ ClaWeb	50	6000		0	0
1-4	Proppant Laden Fluid	IN	pHaserFrac w/ ClaWeb	50	7000	Premium White-20/40	1	7000
1-5	Proppant Laden Fluid	IN	pHaserFrac w/ ClaWeb	50	33000	Premium White-20/40	2	66000
1-6	Proppant Laden Fluid	IN	pHaserFrac w/ ClaWeb	50	22000	Premium White-20/40	3	66000
1-7	Proppant Laden Fluid	IN	pHaserFrac w/ ClaWeb	50	13000	Premium White-20/40	3	39000
1-8	Proppant Laden Fluid	IN	pHaserFrac w/ ClaWeb	50	15000	Premium White-20/40	4	60000
1-9	Proppant Laden Fluid	IN	pHaserFrac w/ ClaWeb	50	3000	CRC-20/40	4	12000
1-10	Flush	IN	Treated Water	50	5000		0	0
Totals					174000			250000

Fluid Details - Treatment 1 Cockroft 34-11 Niobrara Recomplete

PDC Active Fluid Pad					
Volume (Gal)	Base Fluid	Breaker (gal/Mgal)	Clay Control (gal/Mgal)	Surfactant (gal/Mgal)	Surfactant (gal/Mgal)
5000	Fresh Water * 0 - 5000	Vicon NF 10	CLA-Web 0.25	Gasperm 1100 10	Losurf-300D 1

FR-66 Water				
Volume (Gal)	Base Fluid	Surfactant (gal/Mgal)	Surfactant (gal/Mgal)	Clay Control (gal/Mgal)
65000	Fresh Water * 0 - 65000	Gasperm 1100 1.5	Losurf-300D 1	CLA-Web 0.25

pHaserFrac w/ ClaWeb						
Volume (Gal)	Base Fluid	Clay Control (gal/Mgal)	Surfactant (gal/Mgal)	Catalyst (gal/Mgal)	Breaker (gal/Mgal)	Surfactant (gal/Mgal)
	Fresh Water *	CLA-Web	Gasperm 1100	CAT-3	Vicon NF	Losurf-300D
	0 - 6000	0.25	1.5	0	1	1
	6000 - 46000	0.25	1.5	0	1.5	1
	46000 - 68000	0.25	1.5	0.25	1.5	1
	68000 - 81000	0.25	1.5	0.25	2	1
	81000 - 96000	0.25	1.5	0.5	3	1
99000	96000 - 99000	0.25	1.5	0.75	3	1

Treated Water		
Volume (Gal)	Base Fluid	Clay Control (gal/Mgal)
5000	Fresh Water * 0 - 5000	CLA-Web 0.25

* Customer Supplied

Cost Estimate

Cockroft 34-11 Niobrara Recomplete

SAP Quote # 0

<u>Mtrl Nbr</u>	<u>Description</u>	<u>Qty</u>	<u>U/M</u>	<u>Base Amt</u>	<u>Unit Price</u>	<u>Net Amt</u>
342341	PE BOM-GELLED WATER FRAC - CONVENTIONAL	1	JOB			0.00
	Equipment Charges					
224401	FRACTURING -SOLUTION SERVICE CHARG BARRELS/CUBIC METRES (BBL/M3) RATE PER BBL\CUM PRESSURE UNITS (PSI/MPA/BAR) PRESSURE	1 BBL 50 PSI 4500	JOB		218,702.00	28,431.26
428543	2nd Stage Customer Rebate	1	EA			-5,000.00
	Chemical Charges					
467131	FR-66 WATER	65000	GAL			N/C
101766302	FR-66	130	GAL		19,831.50	2,578.09
101985045	CHEM, CLA-WEB - TOTE	44	GAL		20,869.20	2,713.00
437542	PHASERFRAC SBM Vis UNIT OF MEASURE - VISCOSITY	99000 22	GAL			27,902.16
100003833	CL-23	59	GAL			N/C
100003706	BA-20	99	GAL			N/C
100003707	WG-18	2574	LB			N/C
100003707	WG-18 Anything over 26# will be charged.	0	LB			0.00
101770760	GASPERM 1100	296	GAL		72,792.32	9,463.00
101783480	LOSURF-300D	169	GAL		19,205.16	2,496.67
100003852	VICON NF BREAKER	229	GAL		18,913.11	2,458.70
101244422	CAT-3	19	GAL		2,836.13	368.70
	Proppant Charges					
100003678	SAND-PREMIUM WHITE-20/40	2380	SK		104,315.40	13,561.00
101357947	SAND-CRC-20/40	12000	LB		3.03	4,726.80
216319	Proppant Handl & Stor. Sol Chg Per lb	250000	LB		22,500.00	2,925.00
216318	Proppant Del Sol Chg, per ton mile	3750	TNM		15,187.50	1,974.37
	Total	USD				761,144.32
	Discount	USD				666,545.57
	Discounted Total	USD				94,598.75

Primary Plant: Fort Lupton, CO, USA
Secondary Plant: Fort Lupton, CO, USA

Price Book Ref: 01 Western US
Price Date: 1/1/2010

JOB INFORMATION AND TESTING CONDITIONS

Customer: PDC	Fluid System: pHaserFrac	Bob Type: B2
Well Name: Cockroft 34-11 Niobrara	Water Source:	Shear Rate (1/sec): 40
Date: 1/31/13	Temp. (°F): 230	Lab Project ID: Jan31307

FLUID DESIGN

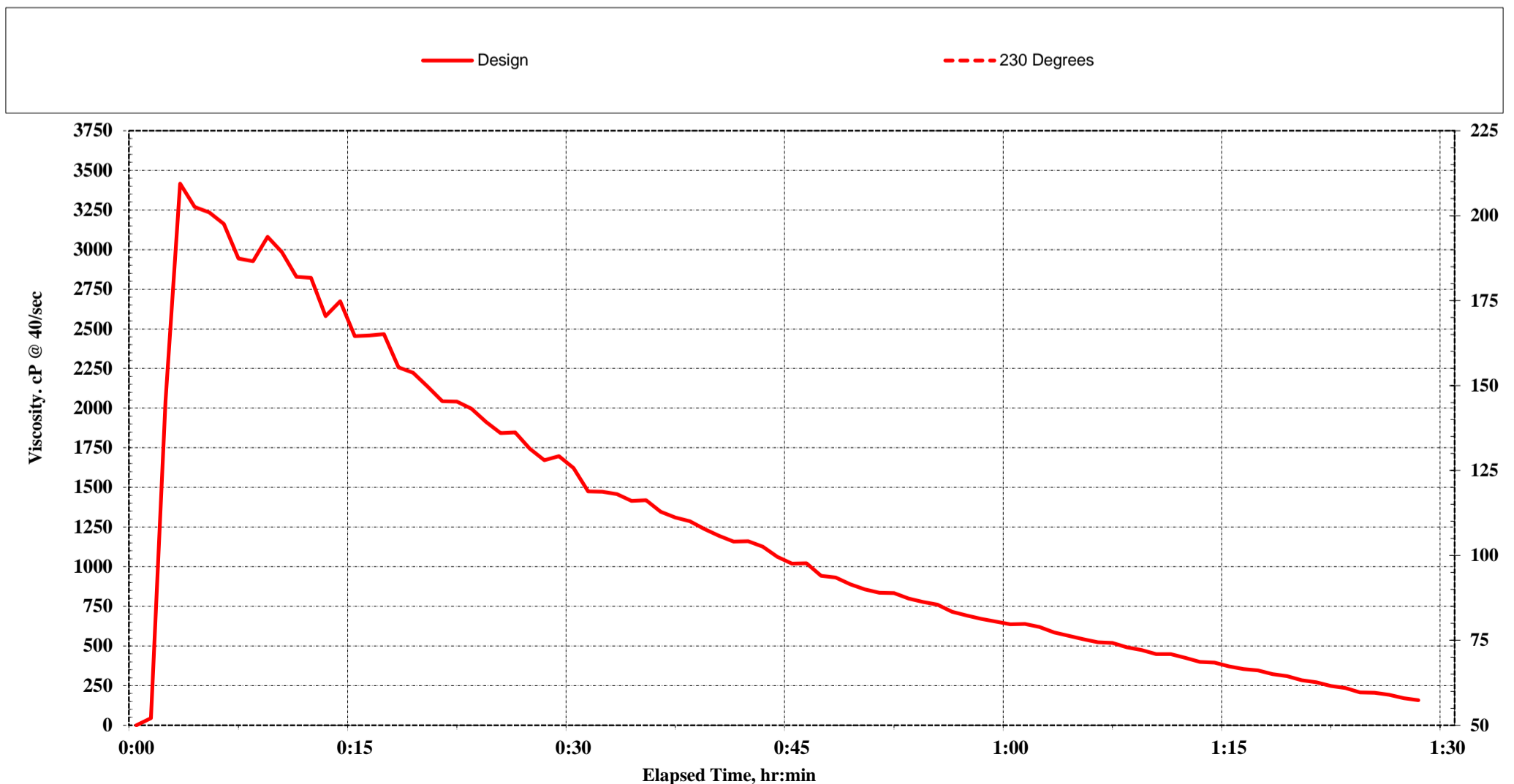
		Test No:	1	2	3	4	5	6	7	8	9	10	Water Analysis (attached)		
Lot #	Chemical	Units	Chemical Concentrations										Sample ID:		
	WG-18	ppt	26.00											Bicarbonate (mg/L)	
														Calcium (mg/L)	
30115F	GasPerm	gpt	1.50											Carbonate (mg/L)	
DV122849330	LoSurf	gpt	1.00											Chloride (mg/L)	
DV013849489	Cla-Web	gpt	0.25											Conductivity (µS/cm)	
														Iron (mg/L)	
BA0400119131	BA-20	gpt	0.80											Magnesium (mg/L)	
														pH	
DV122849367	Vicon	gpt	1.00											Potassium (mg/L)	
														Resistivity (Ω-m)	
CP013810170	CL-23	gpt	0.60											Sodium (mg/L)*	
														Specific Gravity	
														Sulfate (mg/L)	
														TDS (mg/L)*	
														Temperature (°F)	
<i>*calculated values</i>															

FLUID PROPERTIES

		Test No:	1	2	3	4	5	6	7	8	9	10	Gel Hydration (511/s)		
Water pH	7.55												Min.	Viscosity (cP)	Temp. (oF):
Base Gel (#)	26												3	22.8	Ambient
Base Gel Visc (cP)	22.8												6	22.8	Ambient
Base Gel pH	8.57												9	22.8	Ambient
Base Gel Temp. (°F)	62												15		
Buffered pH	4.91												30		
Crosslink pH	4.97														
Final pH	5.01														
Test Temp. (°F)	230														
Break Time (hr:min)	1:08														

Test Notes:

BREAK TEST CHART



16	Hydration Tank
0	0
0.0	

0	0
0.0	

Total Fluid Pumped
0

16	Job Averages
58.3	54.6
7.88	7.79
0.999	1.000
14	17
0	0
14	17
8	5
0.50	0.13
0	3
102	90
200	72
14	14
32	31
339	204

16	Job Average
	#DIV/0!
	#DIV/0!
	#DIV/0!

Customer: P.D.C
Lease: Cockroft 34-11
Date: 2/1/2013
Formation: Codell/Nio Recomplete
Ticket #: 900181013/900181027
Fluid System: pHaserFrac



TANKS	TEMP	pH	S.G.	TEMP Variance
1	58.8	7.13	1.001	-1.1
2	58.8	7.13	1.001	-1.1
3	59.7	7.35	1.001	-0.2
4	59.7	7.35	1.001	-0.2
5	60.8	7.50	1.000	0.9
6	60.1	7.50	1.001	0.2
7	59.0	7.50	1.000	-0.9
8	59.0	7.50	1.001	-0.9
9	60.0	7.61	1.001	0.1
10	59.5	7.65	1.000	-0.4
11	59.5	7.65	1.000	-0.4
12	60.1	7.62	1.000	0.2
13	60.1	7.62	1.000	0.2
14	61.5	7.70	1.001	1.6
15	61.5	7.70	1.001	1.6
16	60.8	7.69	1.000	0.9
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				
31				
32				
33				
34				
35				
Average	59.9	7.5	1.0	0.0

Customer: P.D.C
Lease: Cockroft 34-11
Date: 2/1/2013
Formation: Codell/Nio Recomplete
Ticket #: 900181013/900181027
Fluid System: pHaserFrac

Real Time Sand Sieves

20/40

Unit # 1

MT Mover										
Initial Weight (grams):	COMP 1		COMP 2		COMP 3		COMP 4		COMP 5	
Sand Type:	Wt	%	Wt	%	Wt	%	Wt	%	Wt	%
Sieve # 16	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sieve # 20	1.5	1.5	1.6	1.6	1.7	1.7	2.0	2.0	1.4	1.4
Sieve # 30	41.0	41.7	41.1	42.3	44.5	44.9	46.1	46.5	31.5	31.8
Sieve # 35	42.7	43.4	41.8	43.0	40.7	41.1	38.5	38.8	46.6	47.0
Sieve # 40	9.9	10.1	9.7	10.0	9.2	9.3	9.6	9.7	15.9	16.0
Sieve # 50	3.2	3.3	3.0	3.1	2.9	2.9	3.0	3.0	3.8	3.8
Pan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	98.3	100.0	97.2	100.0	99.0	100.0	99.2	100.0	99.2	100.0
Retained	96.9%		95.3%		95.4%		95.0%		94.8%	

Real Time Sand Sieves

40/70

Unit # 2

MT Mover										
Initial Weight (grams):	COMP 1		COMP 2		COMP 3		COMP 4		COMP 5	
Sand Type:	Wt	%	Wt	%	Wt	%	Wt	%	Wt	%
Sieve # 30	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sieve # 40	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sieve # 50	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sieve # 60	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sieve # 70	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sieve # 100	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Retained	#DIV/0!		#DIV/0!		#DIV/0!		#DIV/0!		#DIV/0!	

Customer: P.D.C
 Lease: Cockroft 34-11
 Formation Codell/Nio Recomplete
 Date: 2/1/2013

Test No: Codell/Nio
 QC Operator: Rob Althenn
 Ticket No: 900181013/900181027
 Engineer: Adebambo Alli

Fann 35 Analysis Data Sheet
QC Field Test

Location Water
7.55 pH

Hydrated
8.73 pH

Buffered to
4.95 pH

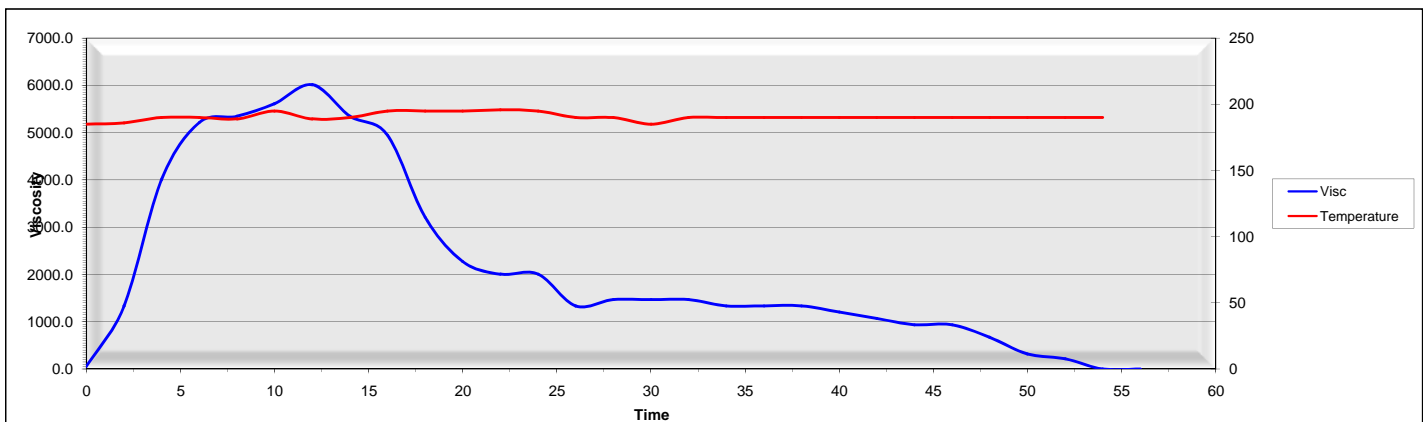
Final
5.00 pH

Crosslink Time	
Temperature	Time
<i>°f</i>	

Hydration Test		
Time	Visc.	Temp. <i>°f</i>
3	24	58 <i>°f</i>
6	24	59 <i>°f</i>
9	24	59 <i>°f</i>

Test Increments: 2 minutes			
Time (Min)	Temp (°F)	Fann35 (Dial)	Apparent Visc
0	185	2	53.5
2	186	50	1337.3
4	190	150	4011.8
6	190	195	5215.3
8	189	200	5349.0
10	195	210	5616.5
12	189	225	6017.6
14	190	200	5349.0
16	195	185	4947.8
18	195	120	3209.4
20	195	85	2273.3
22	196	75	2005.9
24	195	75	2005.9
26	190	50	1337.3
28	190	55	1471.0
30	185	55	1471.0
32	190	55	1471.0
34	190	50	1337.3
36	190	50	1337.3
38	190	50	1337.3
40	190	45	1203.5
42	190	40	1069.8
44	190	35	936.1
46	190	35	936.1
48	190	25	668.6
50	190	12	320.9
52	190	8	214.0
54	190	0	0.0
56			
60% of Initial Reading			32.094

Fluid	pHaserFrac	
Dry Gel		
Submitted Location Water		1000 mL
setpoint: 26.00	WG-18	3.12 grams
Viscosity cp		Temp <i>°f</i>
Components are mixed in 1000 mLs of Hydrated Gel		
Chemicals		
Miscellaneous		
setpoint:		
Surfactants		
setpoint: 1.00	LoSurf-300D	1.00 mL
setpoint: 1.50	GasPerm-1100	1.50 mL
setpoint:		
Clay Control / Stabilizers		
setpoint: 0.25	Cla-Web	0.25 mL
setpoint:		
Buffers		
setpoint: 2.00	BA-20	2.00 mL
setpoint:		
Crosslinkers		
Crosslinker Dilution: 1		To 0
setpoint: 0.60	CL-23	0.60 mL
setpoint:		
setpoint:		
Breakers		
Hydrated Gel Used for Test:		200 mL
setpoint: 0.50	CAT-3	0.100 mL
setpoint: 3.00	VICON NF	0.600 mL
setpoint:		
setpoint:		
setpoint:		



Treatment Interval	Stage Number	Fluid Description	Stage Description	Proppant Description	Prop Conc (ppg)	Slurry Rate (bpm)	Design Clean Volume (gal)	Design Clean Volume (bbl)	Actual Clean Volume (gal)	Actual Clean Volume (bbl)	Design Prop Total (lbs)	Actual Prop Total (lbs)	CL-23 (gpt)	BA-20 (gpt)	Gasperm 1100 (gpt)	Losurf 3000 (gpt)	Cla-Web (gpt)	Vicon NF (gpt)	Cat-3 (gpt)	FR-66 (gpt)	WG-18 (gpt)		
1	1	Active Fluid	Pre Pad			10	5,000	119.0	5,011	119.3					10.00	1.00	0.25	10.00					
	2	FR Water	Pad			50	65,000	1,547.6	65,173	1,551.7					1.50	1.00	0.25			1.31			
	3	pHaserFrac 22 visc	pad			50	6,000	142.9	6,334	150.8			0.60	2.10	1.50	1.00	0.25	1.00				26.00	
	4	pHaserFrac 22 visc	PLF	Ottawa 20/40	1.00	50	7,000	166.7	6,998	166.6	7,000	6,725	0.60	2.10	1.50	1.00	0.25	1.50				26.00	
	5	pHaserFrac 22 visc	PLF	Ottawa 20/40	2.00	50	33,000	785.7	33,007	785.9	66,000	66,839	0.60	2.10	1.50	1.00	0.25	1.50				26.00	
	6	pHaserFrac 22 visc	PLF	Ottawa 20/40	3.00	50	22,000	523.8	22,013	524.1	66,000	64,086	0.60	2.00	1.50	1.00	0.25	1.50	0.25				26.00
	7	pHaserFrac 22 visc	PLF	Ottawa 20/40	3.00	50	13,000	309.5	12,998	309.5	39,000	35,610	0.60	2.00	1.50	1.00	0.25	2.00	0.25				26.00
	8	pHaserFrac 22 visc	PLF	Ottawa 20/40	4.00	50	15,000	357.1	10,265	244.4	60,000	35,920	0.60	2.10	1.50	1.00	0.25	3.00	0.50				26.00
	9	pHaserFrac 22 visc	PLF	SB Excel 20/40	4.00	50	3,000	71.4	5,399	128.5	12,000	17,184	0.60	2.10	1.50	1.00	0.25	3.00	0.75				26.00
	10	Treated Water	Flush				50	5,000	119.0	4,447	105.9							0.25					
Total Fluid							174,000	4,142.9	171,645	4,086.8													

Total Proppant (lbs)	CL-23 (gal)	BA-20 (gal)	Gasperm 1100 (gal)	Losurf 3000 (gal)	Cla-Web (gal)	Vicon NF (gal)	Cat-3 (gal)	FR-66 (gal)	WG-18 (lbs)	
250,000	59	204	296	169	44	229	19	85	2,574	
226,364	58	200	293	167	43	222	18	85	2,522	
250,430	57	192	271	163	29	214	10	92	2,390	
Percent Variance	10.6%	-2.1%	-4.1%	-7.6%	-2.5%	-32.4%	-3.8%	-44.2%	8.0%	-5.2%

Wellbore Path	Volume		Length	Volume	Perfs
	Top	Bottom			
4 1/2" 11.6#	0	6,586	6,586	4,299	
Perforations	6,586	6,700	114		40

Initial Designed Material Volume	CL-23 (gal)	BA-20 (gal)	Gasperm 1100 (gal)	Losurf 3000 (gal)	Cla-Web (gal)	Vicon NF (gal)	Cat-3 (gal)	FR-66 (gal)	WG-18 (lbs)	
226,364	58	200	293	167	43	222	18	85	2,522	
250,430	57	192	271	163	29	214	10	92	2,390	
Percent Variance	10.6%	-2.1%	-4.1%	-7.6%	-2.5%	-32.4%	-3.8%	-44.2%	8.0%	-5.2%

	CL-23 (gal)	BA-20 (gal)	Gasperm 1100 (gal)	Losurf 3000 (gal)	Cla-Web (gal)	Vicon NF (gal)	Cat-3 (gal)	FR-66 (gal)	WG-18 (lbs)
Loaded	520	446	707	550	313	383	320	324	4,234
Excess	461	242	411	381	270	154	302	239	1,660
Leaving	463.00	254.00	436.00	387.00	284.00	169.00	310.00	232.00	1844.00

Post Stage Summary			
Fluid Totals	Planned	Pumped	Average
Active Fluid	5,000	5,011	Pressure 4,436 psi
FR Water	65,000	65,173	Rate 51.0 bpm
pHaserFrac 22 visc	99,000	97,014	Viscosity 25 cP
Treated Water	5,000	4,447	pH 4.96
			Temperature 59 °F
Sand Totals	Planned	Tickets	Max
Ottawa 20/40	238,000	238,430	Pressure 4,810 psi
SB Excel 20/40	12,000	12,000	Rate 54.4 bpm

Sand Tracking

Lease
Formation
Date
SO#

Cockroft 34-11
Niobrara
2/1/2013
900189027

Type	Ottawa 20/40
Design	238,000
Preload	238,480
Delivered	0
Total	238,480
Needed	-480
Pumped	238,480
Remaining	0
Stages	0.0

	Load	Weight
1	39501	45460
2	39499	45520
3	39497	44580
4	39498	45020
5	39500	45900
	Left over from previous well	12000

Type	SB Excel 20/40
Design	12,000
Preload	12,000
Delivered	0
Total	12,000
Needed	0
Pumped	12,000
Remaining	0
Stages	0.0

	Load	Weight
1	No Ticket	12000

2.2 Pipe Information

Equipment	Top MD ft	Bottom MD ft	OD in	ID in	Weight lb/ft
Casing	0.0	7000.0	4.500	4.000	11.60
Surface Pipe	0.0	300.0	5.000	4.000	

2.3 Perforation Intervals

Top MD ft	Bottom MD ft	Number of Shots	Perf Density spf	Perf Phasing °	Perf Orientation °	Perf Diameter in	Perf Formation
6586.0	6588.0	5	2.0	2	0	0.420	Niobrara A Perforation Interval
6692.0	6700.0	25	3.0	2	0	0.420	Niobrara B Perforation Interval

3.0 ACTUAL STAGE SUMMARY

3.1 Stage Summary

Stage Number	Stage Time	Start Time	End Time	Time min	Pump Time min	Max Treat Pr psi	Max Slurry Rate bpm
1	01-Feb-13 16:36:03	16:27:37	01-Feb-13 16:36:03	8.48	4.63	4870	31.5
2	01-Feb-13 17:06:43	16:36:04	01-Feb-13 17:06:43	30.66	30.70	4887	54.4
3	01-Feb-13 17:09:33	17:06:44	01-Feb-13 17:09:33	2.83	2.83	4804	53.6
4	01-Feb-13 17:13:21	17:09:34	01-Feb-13 17:13:21	3.81	3.82	4810	53.2
5	01-Feb-13 17:31:06	17:13:22	01-Feb-13 17:31:06	17.75	17.77	4507	51.8
6	01-Feb-13 17:42:35	17:31:07	01-Feb-13 17:42:35	11.48	11.50	4458	52.2
7	01-Feb-13 17:49:19	17:42:36	01-Feb-13 17:49:19	6.73	6.73	4391	52.0
8	01-Feb-13 17:54:48	17:49:20	01-Feb-13 17:54:48	5.48	5.48	4360	52.0
9	01-Feb-13 17:57:38	17:54:49	01-Feb-13 17:57:38	2.85	2.85	4277	52.1
10	01-Feb-13 18:09:21	17:57:39	01-Feb-13 18:09:21	11.71	6.57	4605	52.1

Stage Number	Stage Time	Max Wellhead Rate bpm	Max Prop Conc lb/gal	Max Slurry Prop Conc lb/gal	Avg Treating Pressure psi	Avg Clean Rate bpm	Avg Slurry Rate bpm
1	01-Feb-13 16:36:03	31.5	0.38	0.38	4289	23.8	23.8
2	01-Feb-13 17:06:43	54.4	0.02	0.02	4543	50.6	50.6
3	01-Feb-13 17:09:33	53.6	0.04	0.04	4699	53.3	53.3
4	01-Feb-13 17:13:21	53.2	1.83	1.90	4430	43.7	45.6
5	01-Feb-13 17:31:06	51.8	2.93	3.00	4362	44.3	48.3
6	01-Feb-13 17:42:35	52.2	3.18	3.18	4356	45.6	51.7
7	01-Feb-13 17:49:19	52.0	3.35	3.46	4365	46.0	51.7
8	01-Feb-13 17:54:48	52.0	3.56	3.56	4265	44.6	51.7
9	01-Feb-13 17:57:38	52.1	3.55	3.55	4247	45.2	51.7
10	01-Feb-13 18:09:21	52.1	2.60	1.33	1622	18.6	18.8

Stage Number	Stage Time	Avg Wellhead Rate bpm	Avg Slurry Prop Conc lb/gal	Avg Hydraulic Horsepower hp	Clean Volume gal	Slurry Volume gal	Wellhead Volume gal
1	01-Feb-13 16:36:03	23.8	0.05	2504	5011	5019	4631
2	01-Feb-13 17:06:43	50.6	0.01	5634	65173	65174	65176
3	01-Feb-13 17:09:33	53.3	0.01	6135	6334	6336	6336
4	01-Feb-13 17:13:21	45.6	0.98	4949	6998	7300	7301
5	01-Feb-13 17:31:06	48.3	2.02	5168	33007	36038	36040
6	01-Feb-13 17:42:35	51.7	2.91	5514	22013	24920	24921
7	01-Feb-13 17:49:19	51.7	2.74	5534	12998	14613	14614
8	01-Feb-13 17:54:48	51.7	3.50	5405	10265	11894	11895
9	01-Feb-13 17:57:38	51.8	3.19	5386	5399	6186	6186
10	01-Feb-13 18:09:21	18.8	0.21	746	5138	5175	5175
Total					172335	182656	182275

Stage Number	Stage Time	Prop Mass 100*lb
1	01-Feb-13 16:36:03	1.87
2	01-Feb-13 17:06:43	0.21
3	01-Feb-13 17:09:33	0.57
4	01-Feb-13 17:13:21	66.68
5	01-Feb-13 17:31:06	668.39
6	01-Feb-13 17:42:35	640.86
7	01-Feb-13 17:49:19	356.10
8	01-Feb-13 17:54:48	359.20
9	01-Feb-13 17:57:38	171.84
10	01-Feb-13 18:09:21	8.22
Total		2273.93

3.2 Bottom Hole Stage Summary

Stage Number	Start Time	Max BH Pressure psi	Avg BH Pressure psi	Max BH Rate bpm	Avg BH Rate bpm	Max BH Conc lb/gal	Avg BH Conc lb/gal
WB/SL	00:00:00	-15	-15	0.0	0.0	0.00	0.00
1	16:35:46	7438	7086	42.2	36.2	0.38	0.04
2	16:39:07	6795	6622	54.1	52.1	0.02	0.00
3	17:08:49	6665	6360	53.0	47.8	0.04	0.01
4	17:11:57	6416	6393	44.2	44.0	1.91	0.96
5	17:15:52	6465	6409	52.0	49.1	3.01	2.03
6	17:33:16	6431	6401	51.8	51.5	3.19	2.93
7	17:44:44	6424	6387	51.8	51.5	3.48	2.75
8	17:51:29	6389	6360	51.9	51.5	3.58	3.52
9	17:56:56	6646	4887	51.9	19.3	3.57	2.45
10	18:07:21	3137	3026	9.8	5.6	1.32	0.84

4.0 PERFORMANCE HIGHLIGHTS

4.1 Job Summary

Start Time	01-Feb-13 15:46:23	
End Time	01-Feb-13 18:09:21	
Pump Time	92.88	min
Start Averaging Time	01-Feb-13 16:27:37	
End Averaging Time	01-Feb-13 18:09:21	
Max Treating Pressure	4887	psi
Max Slurry Rate	54.4	bpm
Max Wellhead Rate	54.4	bpm
Max Gel Rate	54.4	bpm
Max Prop Conc	3.56	lb/gal
Max Slurry Prop Conc	3.56	lb/gal
Avg Treating Pressure	4229	psi
Avg Clean Rate	44.1	bpm
Avg Slurry Rate	46.8	bpm
Avg Wellhead Rate	46.8	bpm
Avg Gel Rate	44.1	bpm
Avg Prop Conc	2.13	lb/gal
Avg Slurry Prop Conc	2.07	lb/gal
Avg Hydraulic Horsepower	4848	hp
Clean Volume	172335	gal
Slurry Volume	182656	gal
Wellhead Volume	182275	gal
Gel Volume	172335	gal
Prop Mass	2273.93	100*lb
BH Max Treating Pressure	7438	psi
BH Avg Treating Pressure	6293	psi
BH Max Rate	54.1	bpm
BH Avg Rate	46.5	bpm
BH Max Proppant Concentration	3.58	lb/gal
BH Avg Proppant Concentration	1.44	lb/gal
Proppant in Wellbore	4.69	100*lb
Load to Recover	172335	gal

Disclaimer: The average and maximum values (except volumes and bottom hole values) are based on the start and end averaging times.

4.2 Job Stage Log

Time	Description	Comment	Treating Pressure psi	Slurry Rate bpm	Job Slurry Vol gal
01-Feb-13 16:27:36	Stage 1	Active Fluid Pad	2433	0.0	0
16:36:04	Stage 2	FR Water Pad	4870	31.5	5019
17:06:44	Stage 3	pHaserFrac Pad	4545	53.7	70193
17:09:34	Stage 4	pHaserFrac Ottawa 20/40 1.00 ppg	4804	53.2	76529
17:13:22	Stage 5	pHaserFrac Ottawa 20/40 2.00 ppg	4348	44.2	83829
17:31:07	Stage 6	pHaserFrac Ottawa 20/40 3.00 ppg	4439	51.7	119868
17:42:36	Stage 7	pHaserFrac Ottawa 20/40 3.00 ppg	4372	51.7	144788
17:49:20	Stage 8	pHaserFrac Ottawa 20/40 4.00 ppg	4353	51.5	159401
17:54:49	Stage 9	pHaserFrac SB Excel 20/40 4.00 ppg	4248	51.6	171295
17:57:39	Stage 10	Treated Water Flush	4270	51.8	177481

Time	Description	Comment	Gel Viscosity cp	Temp @ Slurry Density °F	Gel pH pH
16:27:36	Stage 1	Active Fluid Pad	27.18	44.9	2.00
16:36:04	Stage 2	FR Water Pad	27.16	44.7	9.18
17:06:44	Stage 3	pHaserFrac Pad	27.52	43.5	4.85
17:09:34	Stage 4	pHaserFrac Ottawa 20/40 1.00 ppg	27.63	43.4	4.94
17:13:22	Stage 5	pHaserFrac Ottawa 20/40 2.00 ppg	26.02	43.3	4.99
17:31:07	Stage 6	pHaserFrac Ottawa 20/40 3.00 ppg	20.76	59.8	5.07
17:42:36	Stage 7	pHaserFrac Ottawa 20/40 3.00 ppg	24.54	58.8	5.10
17:49:20	Stage 8	pHaserFrac Ottawa 20/40 4.00 ppg	22.27	56.8	5.07
17:54:49	Stage 9	pHaserFrac SB Excel 20/40 4.00 ppg	21.37	58.3	5.07
17:57:39	Stage 10	Treated Water Flush	21.25	58.8	5.07

4.3 Job Event Log

Stage Number	Event Number	Time	Description	Comment	Treating Pressure psi	Slurry Rate bpm	Job Slurry Vol gal
	1	01-Feb-13 15:46:23	Start Job	Starting Job			
	2	16:25:50	Alarm Low	TEMP: VISC: PH: X-LINC: % Job Complete < 100.0 %	2449	0.0	16725
1		16:27:36	Stage 1	Active Fluid Pad	2433	0.0	0
		16:27:37	Start Averaging	Start Avg Trt 1	2433	0.0	0
	3	16:35:47	Alarm Delta	Stage At Top Perf = 1	4856	30.9	4672
2		16:36:04	Stage 2	FR Water Pad	4870	31.5	5019
	4	16:39:08	Alarm Delta	Stage At Top Perf = 2	4026	41.2	9716
3		17:06:44	Stage 3	pHaserFrac Pad	4545	53.7	70193
	5	17:08:50	Alarm Delta	Stage At Top Perf = 3	4773	53.2	74928
4		17:09:34	Stage 4	pHaserFrac Ottawa 20/40 1.00 ppg	4804	53.2	76529
	6	17:10:08	Alarm Low	TEMP:59 VISC:26 PH: 4.85 X-LINC:40 % Job Complete < 100.0 %	4784	53.1	77831
	7	17:11:58	Alarm Delta	Stage At Top Perf = 4	4363	44.1	81232
5		17:13:22	Stage 5	pHaserFrac Ottawa 20/40 2.00 ppg	4348	44.2	83829
	8	17:13:53	Alarm Low	TEMP:59 VISC: PH:4.95 X-LINC:43 % Job Complete < 100.0 %	4311	44.1	84789
	9	17:15:54	Alarm Delta	Stage At Top Perf = 5	4218	44.3	88536
	10	17:17:51	Alarm Low	TEMP:59 VISC:26 PH:4.83 X-LINC:40 % Job Complete < 100.0 %	4189	44.2	92160
	11	17:22:24	Alarm Low	TEMP: VISC:25 PH: X-LINC: % Job Complete < 100.0 %	4480	51.4	101011
6		17:31:07	Stage 6	pHaserFrac Ottawa 20/40 3.00 ppg	4439	51.7	119868
	12	17:33:17	Alarm Delta	Stage At Top Perf = 6	4325	51.8	124593
	13	17:33:21	Alarm Low	TEMP:59.7 VISC:24 PH:4.93 X-LINC:45 % Job Complete < 100.0 %	4334	51.8	124738
7		17:42:36	Stage 7	pHaserFrac Ottawa 20/40 3.00 ppg	4372	51.7	144788
	14	17:44:45	Alarm Delta	Stage At Top Perf = 7	4374	52.0	149491
	15	17:44:46	Alarm Low	TEMP:59 VISC:26 PH:4.97 X-LINC:40 % Job Complete < 100.0 %	4374	52.0	149527
8		17:49:20	Stage 8	pHaserFrac Ottawa 20/40 4.00 ppg	4353	51.5	159401
	16	17:51:30	Alarm Delta	Stage At Top Perf = 8	4246	51.6	164135
	17	17:51:36	Alarm Low	TEMP:58 VISC:24 PH:5.07 X-LINC:51 % Job Complete < 100.0 %	4245	51.7	164351
9		17:54:49	Stage 9	pHaserFrac SB Excel 20/40 4.00 ppg	4248	51.6	171295
	18	17:56:58	Alarm Delta	Stage At Top Perf = 9	4257	51.6	175998
10		17:57:39	Stage 10	Treated Water Flush	4270	51.8	177481

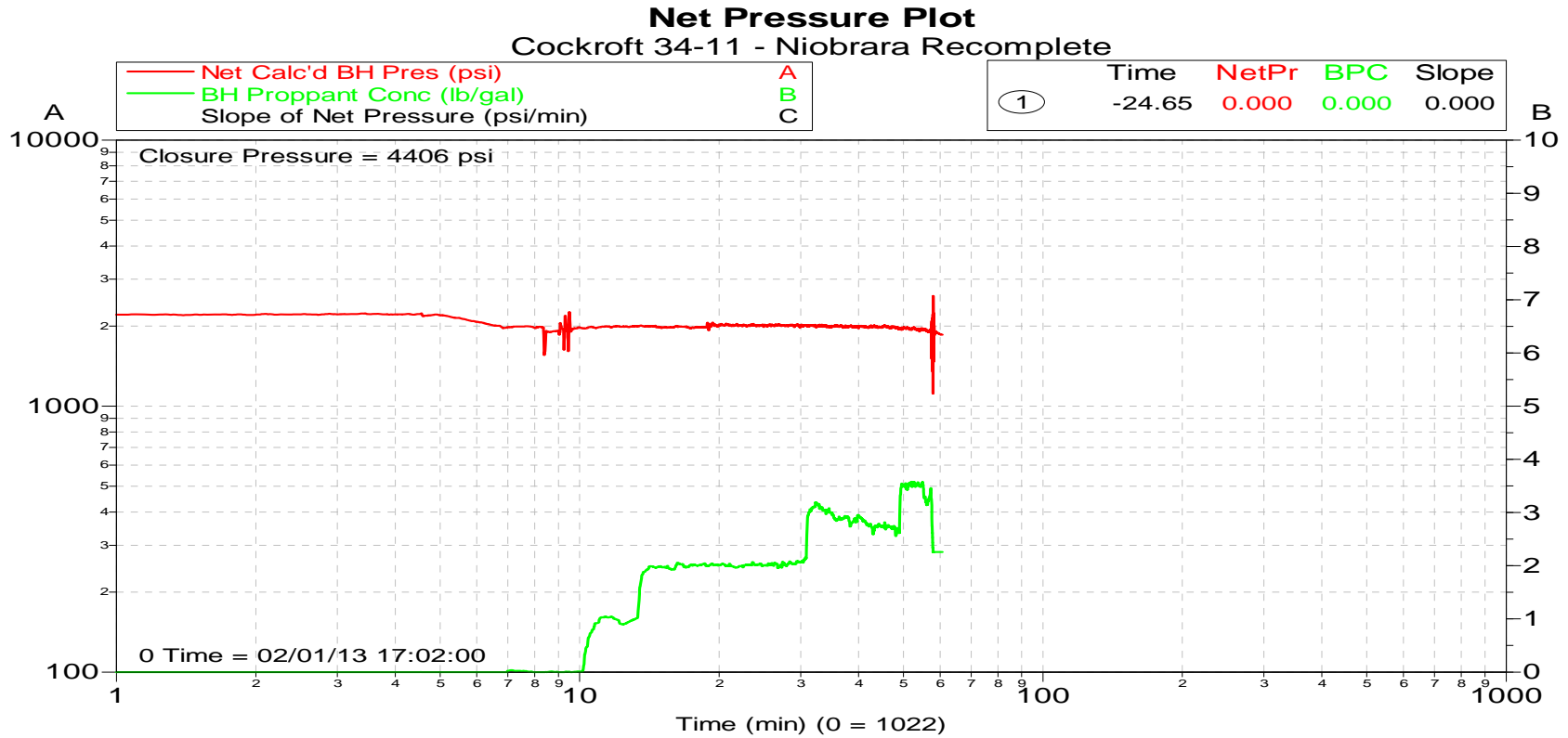
Stage Number	Event Number	Time	Description	Comment	Treating Pressure psi	Slurry Rate bpm	Job Slurry Vol gal
	19	18:07:22	Alarm Delta	Stage At Top Perf = 10	24	3.4	182182
		18:09:21	End Averaging	End Avg Trt 1	78	3.6	182655
	20	18:09:23	End Job	Ending Job	75	1.3	182656

Stage Number	Event Number	Time	Description	Comment	Gel Viscosity cp	Temp @ Slurry Density °F	Gel pH pH
	1	15:46:23	Start Job	Starting Job			
	2	16:25:50	Alarm Low	TEMP: VISC: PH: X-LINC: % Job Complete < 100.0 %	27.05	44.9	2.01
1		16:27:36	Stage 1	Active Fluid Pad	27.18	44.9	2.00
		16:27:37	Start Averaging	Start Avg Trt 1	27.07	44.9	2.00
	3	16:35:47	Alarm Delta	Stage At Top Perf = 1	27.27	44.7	9.29
2		16:36:04	Stage 2	FR Water Pad	27.16	44.7	9.18
	4	16:39:08	Alarm Delta	Stage At Top Perf = 2	27.32	44.6	7.85
3		17:06:44	Stage 3	pHaserFrac Pad	27.52	43.5	4.85
	5	17:08:50	Alarm Delta	Stage At Top Perf = 3	27.65	43.4	5.02
4		17:09:34	Stage 4	pHaserFrac Ottawa 20/40 1.00 ppg	27.63	43.4	4.94
	6	17:10:08	Alarm Low	TEMP:59 VISC:26 PH: 4.85 X-LINC:40 % Job Complete < 100.0 %	27.45	43.4	4.96
	7	17:11:58	Alarm Delta	Stage At Top Perf = 4	25.98	43.3	4.99
5		17:13:22	Stage 5	pHaserFrac Ottawa 20/40 2.00 ppg	26.02	43.3	4.99
	8	17:13:53	Alarm Low	TEMP:59 VISC: PH:4.95 X-LINC:43 % Job Complete < 100.0 %	25.86	43.3	5.00
	9	17:15:54	Alarm Delta	Stage At Top Perf = 5	26.05	43.2	5.03
	10	17:17:51	Alarm Low	TEMP:59 VISC:26 PH:4.83 X-LINC:40 % Job Complete < 100.0 %	26.76	43.3	5.04
	11	17:22:24	Alarm Low	TEMP: VISC:25 PH: X-LINC: % Job Complete < 100.0 %	21.34	59.4	5.07
6		17:31:07	Stage 6	pHaserFrac Ottawa 20/40 3.00 ppg	20.76	59.8	5.07
	12	17:33:17	Alarm Delta	Stage At Top Perf = 6	21.09	59.8	5.08
	13	17:33:21	Alarm Low	TEMP:59.7 VISC:24 PH:4.93 X-LINC:45 % Job Complete < 100.0 %	21.07	59.8	5.08
7		17:42:36	Stage 7	pHaserFrac Ottawa 20/40 3.00 ppg	24.54	58.8	5.10
	14	17:44:45	Alarm Delta	Stage At Top Perf = 7	22.36	56.3	5.07
	15	17:44:46	Alarm Low	TEMP:59 VISC:26 PH:4.97 X-LINC:40 % Job Complete < 100.0 %	22.27	56.3	5.07
8		17:49:20	Stage 8	pHaserFrac Ottawa 20/40 4.00 ppg	22.27	56.8	5.07
	16	17:51:30	Alarm Delta	Stage At Top Perf = 8	23.12	57.6	5.05
	17	17:51:36	Alarm Low	TEMP:58 VISC:24 PH:5.07 X-LINC:51 % Job Complete < 100.0 %	23.21	57.7	5.05
9		17:54:49	Stage 9	pHaserFrac SB Excel 20/40 4.00 ppg	21.37	58.3	5.07
	18	17:56:58	Alarm Delta	Stage At Top Perf = 9	21.30	58.7	5.08
10		17:57:39	Stage 10	Treated Water Flush	21.25	58.8	5.07
	19	18:07:22	Alarm Delta	Stage At Top Perf = 10	6.65	56.1	6.24
		18:09:21	End Averaging	End Avg Trt 1	6.47	59.5	6.97

Stage Number	Event Number	Time	Description	Comment	Gel Viscosity cp	Temp @ Slurry Density °F	Gel pH pH
	20	18:09:23	End Job	Ending Job	6.47	59.5	6.98

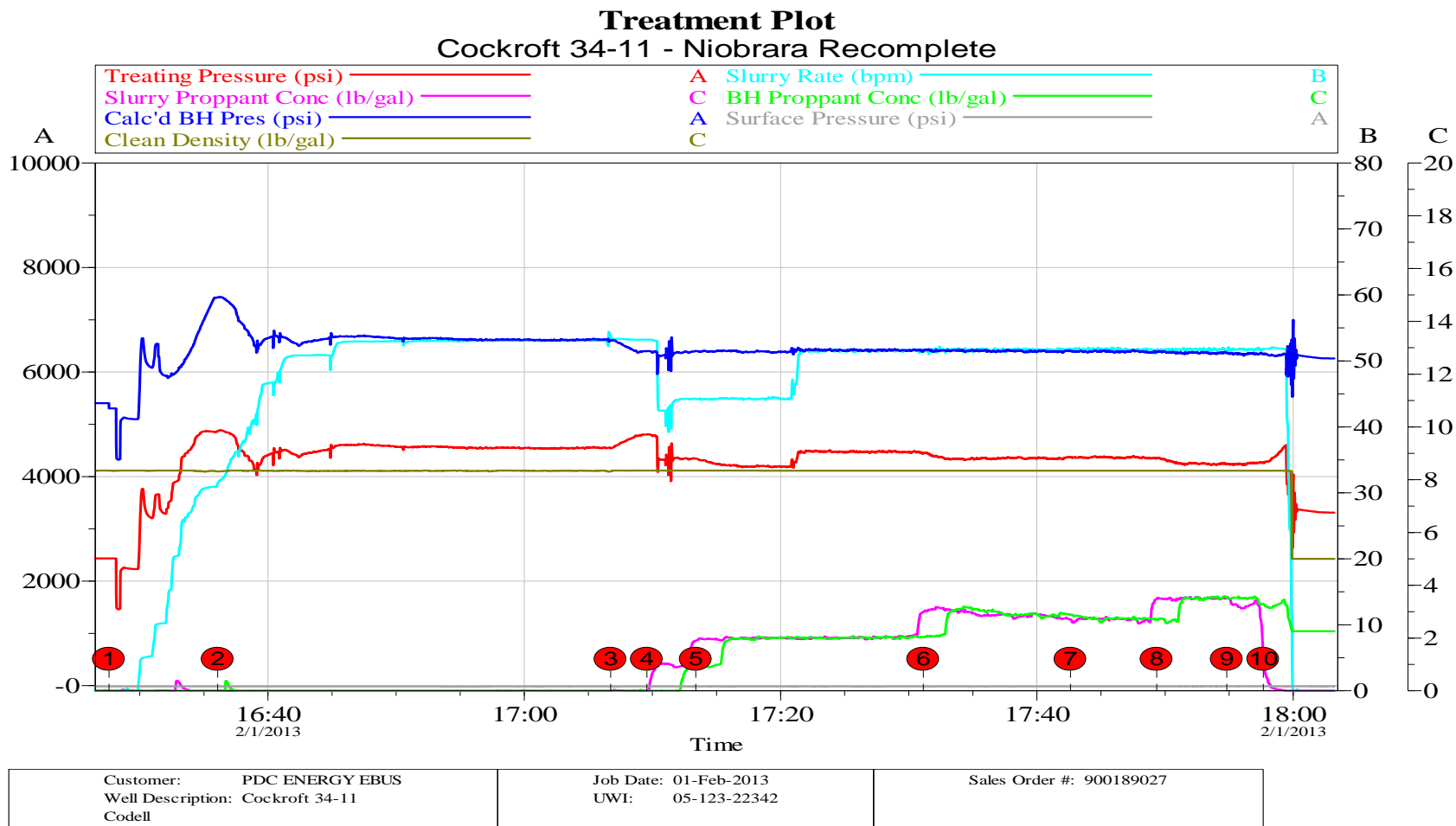
5.0 ATTACHMENTS

5.1 Net Pressure Plot - Cockroft 34-11 - Niobrara Recomplete

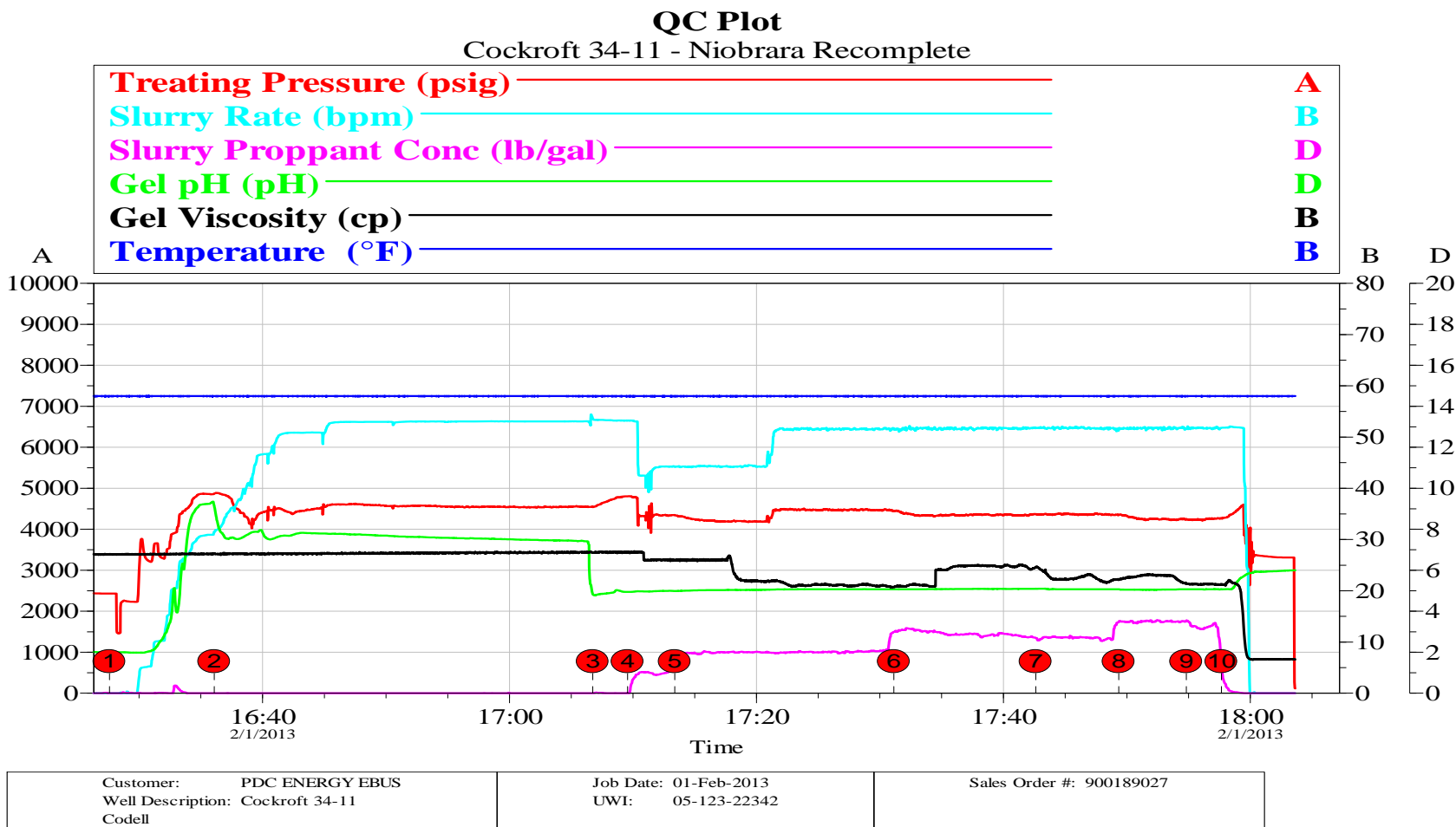


Customer: PDC ENERGY EBUS	Job Date: 01-Feb-2013	Sales Order #: 900189027
Well Description: Cockroft 34-11	UWI: 05-123-22342	

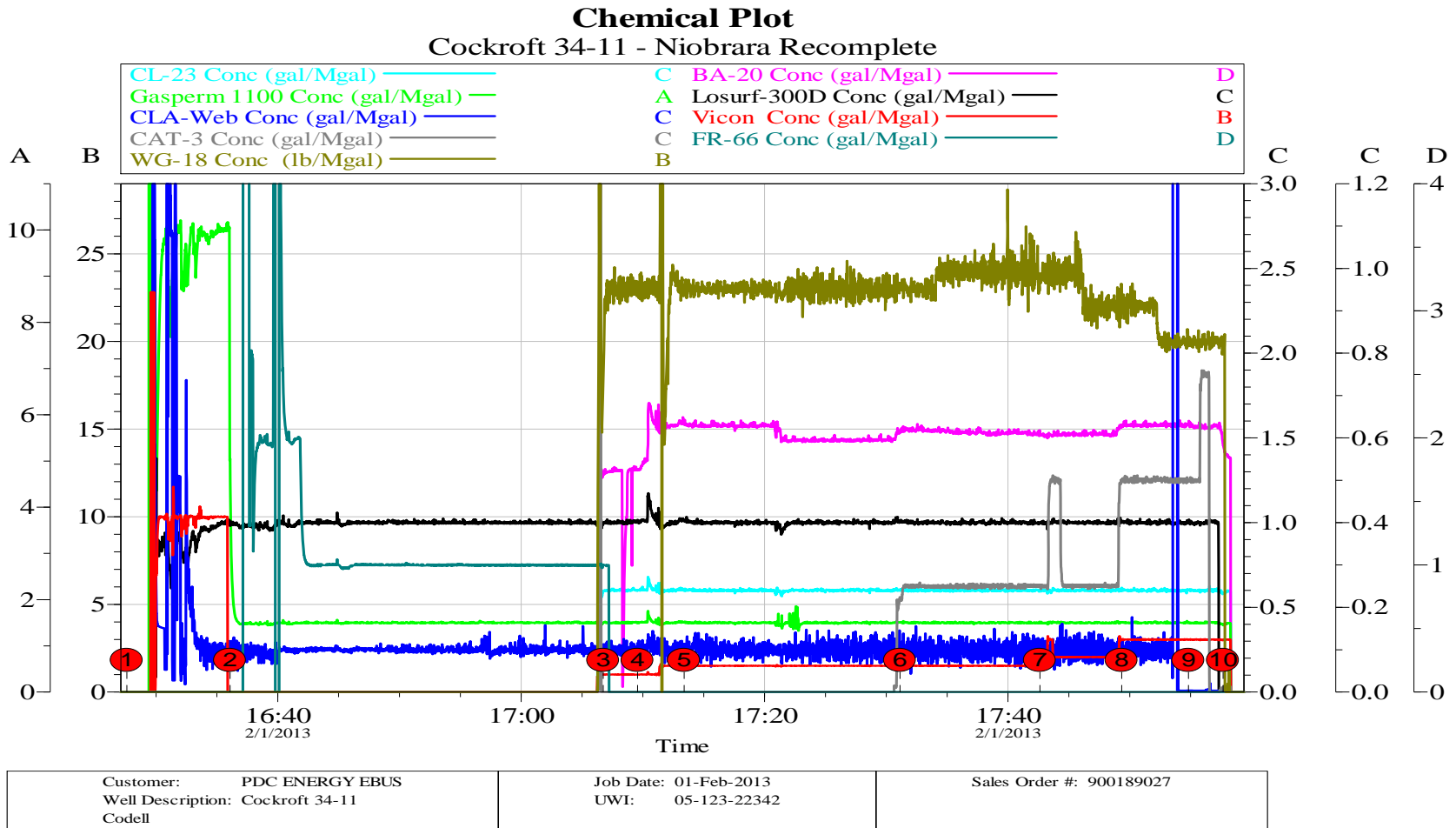
5.2 Treatment Plot - Cockroft 34-11 - Niobrara Recomplete



5.3 QC Plot - Cockroft 34-11 - Niobrara Recomplete



5.4 Chemical Plot - Cockroft 34-11 - Niobrara Recomplete



HALLIBURTON

Engineering Executive Summary

On February 01, 2013 a stimulation treatment was performed in the Niobrara formation on the Cockroft 34-11 well. The following information was gathered during the treatment.

Fluid System	Active Fluid
Fluid System	FR Water
Fluid System	pHaserFrac 22 visc
Fluid System	Treated Water
Fluid System	0
Proppant	Ottawa 20/40
Proppant	SB Excel 20/40
Proppant	0
Proppant	4436
Proppant	51
Formation	Niobrara
Total Stim-Sleeve Zones	0
Total Plug and Perf Zones	1

Prior to pumping the job, Quality Control tests were conducted on location to determine hydration time, crosslink time, and gel viscosity. Chemical concentrations were adjusted, as needed, according to test results, pump times, and onsite water.

Treatment Information

Zone 1

Treatment Interval Technical Comments:

Start: 16:27

End: 18:00

Notes: Adjusted Visc to match QC. Lost HHP during 1.00 ppg sand stage causing us to drop down to 44 bbl/min on our rate. All proppant placed. All fluid samples looked good. Final ISIP=3429. FG=.945

We appreciate the opportunity to service your well. If you have any questions about the job, or anything else, please call me at (303) 655-4700.

Thank you,

Traviss Dorris
Associate Field Technician
Halliburton Energy Services

Adebambo Alli
Technical Professional
Halliburton Energy Services

Field Ticket

Field Ticket Number: 900189027		Field Ticket Date: Friday, February 01, 2013	
Bill To: PDC ENERGY EBUS DO NOT MAIL - BOX 26 BRIDGEPORT, WV 26330		Job Name: Cockcroft 34-11 Niobrara Recomplete Order Type: Streamline Order (ZOH) Well Name: Cockcroft 34-11 Company Code: 1100 Customer PO No.: NA Shipping Point: Fort Lupton, CO, USA Sales Office: Rocky Mountains BD Well Type: Gas Well Category: Development	
Ship To: PDC COCKROFT 34-11, WELD COCKROFT 2380176 GALETON, CO 80622			

Material	Description	QTY	UOM	Base Amt	Unit Amt	Gross Amount	Discount	Net Amount
342341	PE BOM-GELLED WATER FRAC - CONVENTIONA	1	JOB	0.00	0.00	0.00	87%	0.00
224401	FRACTURING -SOLUTION SERVICE CHARG	1	JOB	0.00	218,702.00	218,702.00	87%	28,431.26
	BARRELS/CUBIC METRES (BBL/M3)		BBL					
	RATE PER BBLICUM	51						
	PRESSURE UNITS (PSI/MPA/BAR)		PSI					
	PRESSURE	4500						
428543	2nd Stage Customer Rebate	1	EA	0.00	5,000.00	-5,000.00		-5,000.00
467131	FR-66 WATER	65173	GAL		0.00	0.00		0.00
101766302	FR-66	92	GAL	0.00	14,034.60	14,034.60	87%	1,824.50
101985045	CHEM, CLA-WEB - TOTE	29	GAL	0.00	13,754.70	13,754.70	87%	1,788.11
437542	PHASERFRAC SBM	97014	GAL		2,168.00	210,326.35	87%	27,342.43
	Vis	22						
	UNIT OF MEASURE - VISCOSITY	0						
100003833	CL-23	64	GAL		0.00	0.00		0.00
100003706	BA-20	146	GAL		0.00	0.00		0.00
100003706	BA-20	46	GAL	0.00	8,041.72	8,041.72	87%	1,045.42
100003707	WG-18	2390	LB		0.00	0.00		0.00
101770760	GASPERM 1100	271	GAL	0.00	66,644.32	66,644.32	87%	8,663.76
101783480	LOSURF-300D	163	GAL	0.00	18,523.32	18,523.32	87%	2,408.03
100003852	VICON NF BREAKER	214	GAL	0.00	17,674.26	17,674.26	87%	2,297.65

Field Ticket

Field Ticket Number: 900189027 **Field Ticket Date:** Friday, February 01, 2013

Bill To:
 PDC ENERGY EBUS
 DO NOT MAIL - BOX 26
 BRIDGEPORT, WV 26330

Job Name: Cockroft 34-11 Niobrara Recomplete
Order Type: Streamline Order (ZOH)
Well Name: Cockroft 34-11
Company Code: 1100
Customer PO No.: NA
Shipping Point: Fort Lupton, CO, USA
Sales Office: Rocky Mountains BD
Well Type: Gas
Well Category: Development

Ship To:
 PDC COCKROFT 34-11, WELD
 COCKROFT
 2380176
 GALETON, CO 80622

Material	Description	QTY	UOM	Base Amt	Unit Amt	Gross Amount	Discount	Net Amount	
101244422	CAT-3	10	GAL	0.00	1,492.70	1,492.70	87%	194.05	
100003678	SAND-PREMIUM WHITE-20/40	2384	SK	0.00	104,490.72	104,490.72	87%	13,583.79	
101357947	SAND-CRC-20/40	12000	LB	0.00	3.03	36,360.00	87%	4,726.80	
216319	Proppant Handl & Stor. Sol Chg Per lb	250480	LB	0.00	22,543.20	22,543.20	87%	2,930.62	
216318	Proppant Del Sol Chg, per ton mile	4383	TNM	0.00	17,751.15	17,751.15	87%	2,307.65	
Totals						USD	745,339.04	652,794.97	92,544.07

Halliburton Rep: RYAN FADELEY
 Customer Agent: DOM GARDELLA
 Halliburton Approval

THIS OUTPUT DOES NOT INCLUDE TAXES. APPLICABLE SALES TAX WILL BE BILLED ON THE FINAL INVOICE.
 CUSTOMER HEREBY ACKNOWLEDGES RECEIPT OF THE MATERIALS AND SERVICES DESCRIBED ABOVE AND ON THE ATTACHED DOCUMENTS.

X

 Customer Signature FIELD TICKET TOTAL: USD 92,544.07

Was our HSE performance satisfactory? **Y or N** Were you satisfied with our Equipment? **Y or N** Were you satisfied with our people? **Y or N**
 (Health, Safety, Environment)

Comments
