
Hillcorp Energy

Treatment Summary

Nazareus 16-8

Adams County, CO

SESE Sec 8 T2S R64W

Niobrara

pHaserFrac

November 21, 2011

HALLIBURTON

Hilcorp Energy
1201 Louisiana Suite 1400
Houston, Texas 77002

Nazareus 16-8

Adams County, Colorado
United States of America
S:8 T:2S R:64W
API/UWI 05-001-09309

Nazareus 16-8 - Hilcorp - Niobrara Stage - pHaferFrac

Prepared for:

November 16, 2011
Version: 3

Submitted by:
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HALLIBURTON

***Halliburton appreciates the opportunity to present
this proposal and looks forward to being of service to you.***

Foreword

Enclosed is our recommended procedure for fracturing the formation in the referenced well. The information in this proposal includes well data, calculations, material requirements, and cost estimates. This proposal is based on information from our field personnel and previous stimulation services in the area. Halliburton appreciates the opportunity to present this proposal for your consideration and we look forward to being of service to you. Our Services for your well will be coordinated through the Service Center listed below. If you require any additional information or additional designs, please feel free to contact myself or our field representatives listed below.

Prepared and Submitted by: _____

Bryan Haubert
Technical Advisor

SERVICE CENTER:	Brighton
SERVICE COORDINATOR:	Louis Piper / Anthony Esparza
OPER. ENGINEER:	Brandon Baker
PHONE NUMBER:	303-655-4700

Well Information**Nazareus 16-8 - Niobrara Stage**

Well Name: Nazareus Well #: 16-8

Tubulars

Name	Measured Depth (ft)	Outer Diameter (in)	Inner Diameter (in)	Linear Weight (lbm/ft)
Casing	0 - 10000	4.5	4	11.6

Perforations

Interval Name/ Depth (ft)
Codell Stage / 8000 - 8010
Niobrara Stage / 7500 - 7550

Formations

Name	Top MD (ft)	Bottom MD (ft)
Niobrara Formation	7500	7550

Job Fluids Summary

Nazarenus 16-8 - Niobrara Stage

pHaserFrac (22)									
Volume	Base Fluid	Crosslinker	Crosslinker	Buffer	Gelling Agent	Surfactant	Clay Control	Breaker	Catalyst
77000 (Gal)	Fresh Water*	CL-37	CL-40 Crosslinker	BA-20	WG-18	Gasperm 1100	CLA-Web	Vicon NF	CAT-3
Totals	77000 (Gal)	38.5 (Gal)	77 (Gal)	77 (Gal)	2002 (lbm)	154 (Gal)	38.5 (Gal)	385 (Gal)	15.9 (Gal)

Treated Water			
Volume	Base Fluid	Surfactant	Clay Control
5000 (Gal)	Fresh Water*	Gasperm 1100	CLA-Web
Totals	5000 (Gal)	10 (Gal)	2.5 (Gal)

FR-66 Water					
Volume	Base Fluid	Friction Reducer	Breaker	Surfactant	Clay Control
76000 (Gal)	Fresh Water*	FR-66	Vicon NF	Gasperm 1100	CLA-Web
Totals	76000 (Gal)	76 (Gal)	152 (Gal)	152 (Gal)	38 (Gal)

HCL Acid 15% (22 Be) - with Adds				
Volume	Mixing Fluid	Raw Acid	Surfactant	Corrosion Inhibitor
750 (Gal)	Fresh Water	HCL Acid Raw	Losurf-300D	HAI-404M
Totals	458.25 (Gal)	291 (Gal)	1.5 (Gal)	4.5 (Gal)

JOB TOTALS								
Volume (Gal)	Base Fluid (Gal)	Crosslinker (Gal)	Crosslinker (Gal)	Buffer (Gal)	Gelling Agent (lbm)	Surfactant (Gal)	Clay Control (Gal)	Breaker (Gal)
	Fresh Water*	CL-37	CL-40 Crosslinker	BA-20	WG-18	Gasperm 1100	CLA-Web	Vicon NF
	158458.25	38.5	77	77	2002	316	79	537
	Catalyst	Friction Reducer	Raw Acid	Surfactant	Corrosion Inhibitor			
	(Gal)	(Gal)	(Gal)	(Gal)	(Gal)			
	CAT-3	FR-66	HCL Acid Raw	Losurf-300D	HAI-404M			
	15.9	76	291	1.5	4.5			

Proppant		
	Designed Qty	Requested
CRC-20/40	12000 (lbm)	12000 (lbm)
Premium White-40/70	18750 (lbm)	18750 (lbm)
Premium White-30/50	170000 (lbm)	170000 (lbm)

Customer Supplied Items *			
	Designed Qty	Tank Bottom	Requested w/ Tank Bottom
Fresh Water	158000 Gal	0 Gal	158000 Gal

Treatment 1

Nazareus 16-8 - Niobrara Stage

Well Name	Nazareus	HCL Acid 15% (22 Be) - with Adds	750 Gal
Job Name	Nazareus 16-8 - Niobrara Stage	FR-66 Water	76000 Gal
Estimated Pump Time	1.45 hrs	pHaserFrac (22)	77000 Gal
BHST	240 degF	Treated Water	5000 Gal
		Premium White-40/70	18750 lbm
		Premium White-30/50	170000 lbm
		CRC-20/40	12000 lbm

Casing (Surface)								
Trt-Stage	Stage Desc.	Flow Path	Fluid Desc.	Rate-Liq+Prop	Clean Vol.	Proppant	Proppant Conc.	Prop. Mass
1-1	Acid	IN	HCL Acid 15% (22 Be) - with Adds	5	750		0	0
1-2	Pad	IN	FR-66 Water	50	25000		0	0
1-3	Proppant Laden Fluid	IN	FR-66 Water	50	27000	Premium White-40/70	0.25	6750
1-4	Proppant Laden Fluid	IN	FR-66 Water	50	24000	Premium White-40/70	0.5	12000
1-5	Pad	IN	pHaserFrac (22)	50	5000		0	0
1-6	Proppant Laden Fluid	IN	pHaserFrac (22)	50	16000	Premium White-30/50	1	16000
1-7	Proppant Laden Fluid	IN	pHaserFrac (22)	50	20000	Premium White-30/50	2	40000
1-8	Proppant Laden Fluid	IN	pHaserFrac (22)	50	18000	Premium White-30/50	3	54000
1-9	Proppant Laden Fluid	IN	pHaserFrac (22)	50	15000	Premium White-30/50	4	60000
1-10	Proppant Laden Fluid	IN	pHaserFrac (22)	50	3000	CRC-20/40	4	12000
1-11	Flush	IN	Treated Water	20	5000		0	0
Totals					158750			200750

Fluid Details - Treatment 1

Nazarenus 16-8 - Niobrara Stage

HCL Acid 15% (22 Be) - with Adds					
Volume (Gal)	Base Fluid	Mixing Fluid (gal/Mgal)	Raw Acid (gal/Mgal)	Surfactant (gal/Mgal)	Corrosion Inhibitor (gal/Mgal)
750	HCL Acid 0 - 750	Fresh Water 611	HCL Acid Raw 388	Losurf-300D 2	HAI-404M 6

FR-66 Water					
Volume (Gal)	Base Fluid	Friction Reducer (gal/Mgal)	Breaker (gal/Mgal)	Surfactant (gal/Mgal)	Clay Control (gal/Mgal)
76000	Fresh Water * 0 - 76000	FR-66 1	Vicon NF 2	Gasperm 1100 2	CLA-Web 0.5

pHaserFrac (22)									
Volume (Gal)	Base Fluid	Crosslinker (gal/Mgal)	Crosslinker (gal/Mgal)	Buffer (gal/Mgal)	Gelling Agent (lbm/Mgal)	Surfactant (gal/Mgal)	Clay Control (gal/Mgal)	Breaker (gal/Mgal)	Catalyst (gal/Mgal)
	Fresh Water *	CL-37	CL-40	BA-20	WG-18	Gasperm 1100	CLA-Web	Vicon NF	CAT-3
	0 - 41000	0.5	1	1	26	2	0.5	5	0.15
	41000 - 74000	0.5	1	1	26	2	0.5	5	0.25
77000	74000 - 77000	0.5	1	1	26	2	0.5	5	0.5

Treated Water			
Volume (Gal)	Base Fluid	Surfactant (gal/Mgal)	Clay Control (gal/Mgal)
5000	Fresh Water * 0 - 5000	Gasperm 1100 2	CLA-Web 0.5

* Customer Supplied

Company: Hillcorp Energy
Lease: Nazarenus 16-8
Formation: Niobrara

pHaserFrac
CW 230 ^d

Location: SESE Sec 8 T2S R64W



Stage	Fluid Schedule	Volume (gal)	Proppant Type.	Prop Conc. (ppg)	Prop Total (lbs)	Slurry Vol. (gals)	Rate (bpm)	Stage Time (h:min:sec)	Exposure Time (h:min:sec)	CL-40 (gpt)	CL-37 (gpt)	BA-20 (gpt)	GasPerm 1100 (gpt)	Cla-Web (gpt)	VICON NF (gpt)	CAT-3 (gpt)	FR-66 (gpt)	WG-18 (ppt)
1	15% HCl Acid	750				750	5	0:03:34	1:23:08									
2	FR Water Pad	25000				25000	50	0:11:54	1:19:34				2.00	0.50	2.00		1.00	
3	FR Water	27000	Ottawa 40/70	0.25	6750	27305	50	0:13:00	1:07:40				2.00	0.50	2.00		1.00	
4	FR Water	24000	Ottawa 40/70	0.5	12000	24543	50	0:11:41	0:54:39				2.00	0.50	2.00		1.00	
5	pHaserFrac Pad	5000				5000	50	0:02:23	0:42:58	1.00	0.50	1.00	2.00	0.50	5.00	0.15		26.00
6	pHaserFrac 22 visc	16000	Ottawa 30/50	1	16000	16724	50	0:07:58	0:40:35	1.00	0.50	1.00	2.00	0.50	5.00	0.15		26.00
7	pHaserFrac 22 visc	20000	Ottawa 30/50	2	40000	21810	50	0:10:23	0:32:37	1.00	0.50	1.00	2.00	0.50	5.00	0.25		26.00
8	pHaserFrac 22 visc	18000	Ottawa 30/50	3	54000	20443	50	0:09:44	0:22:14	1.00	0.50	1.00	2.00	0.50	5.00	0.25		26.00
9	pHaserFrac 22 visc	15000	Ottawa 30/50	4	60000	17715	50	0:08:26	0:12:30	1.00	0.50	1.00	2.00	0.50	5.00	0.50		26.00
10	pHaserFrac 22 visc	3000	CRC-20/40	4	12000	3543	50	0:01:41	0:04:04	1.00	0.50	1.00	2.00	0.50	5.00	0.50		26.00
11	Flush	5000				5000	50	0:02:23	0:02:23				2.00	0.50				
								0:00:00										

Total Pump Time: 1:23														
TOTAL FLUID:	158750 gal	Total Proppant:	200750	167834	Final Design Used	77	39	77	316	79	537	22	76	2002
Pad+SLF+Flush:	158000 gal	Average Rate:		48.1 bpm										
Pad+SLF:	153000 gal	Treatment Down:		Casing	CL-40	CL-37	BA-20	GasPerm 1100	Cla-Web	VICON NF	CAT-3	FR-66	WG-18	
Percent Pad:	52.9%	Abs. Min. HHP:		6,130 HHP	Loaded	101	53	101	400	104	676	32	100	2508

MAX PRESSURE:	5000 psi	S.G.:	0.9
Anticipated Surface Pres:	##### psi	T Perf	B Perf
Perforations: ?		Perf Zone #1	Verify
Dia. in: 0.42		Perf Zone #2	Perfs
Calc. Perf Fric (psi): #####		Perf Zone #3	
Est. Well Bore Fric (psi): 2,500		Perf Zone #4	
WELL-BORE PATH			
4 1/2" 11.6	Verify	ft	
		ft	
		ft	

MAXIMUM CHEMICAL ADDITIVE									
Pump Rates (gal/min)	CL-40	CL-37	BA-20	GasPerm 1100	Cla-Web	VICON NF	CAT-3	FR-66	WG-18
50.0 bpm									
Bucket Test Time for 1 gal (min:sec)	0.29	0.57	0.29	0.14	0.57	0.06	0.57	0.29	0.01

Customer: Hillcorp Energy
Well: Nazareus 16-8
Date: 11/21/2011
Formation: Niobrara
Ticket #: 9074969

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MT. MOVER

	COMP # 1	COMP # 2	COMP # 3	COMP # 4	COMP # 5	TOTAL
Sand Size	30/50	30/50	30/50	30/50	30/50	
Est. Amt. (sacks)	0	425	430	426	425	1706
Amt. Pumped (sacks)	0	425	430	426	425	1706
Amt. Returned (sacks)	0	0	0	0	0	0

SAND SIEVE ANALYSIS

30/50 SAND

Initial Weight(grams):	COMP 1		COMP 2		COMP 3		COMP 4		COMP 5	
Sand Type:	Wt	%	Wt	%	Wt	%	Wt	%	Wt	%
Pan #20.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pan #30	0.0	0.0	0.3	0.3	0.3	0.3	0.1	0.1	0.3	0.3
Pan #40	0.0	0.0	68.0	68.4	74.5	74.4	64.0	64.1	69.6	69.6
Pan #45	0.0	0.0	27.6	27.8	19.9	19.9	26.9	27.0	23.5	23.5
Pan #50	0.0	0.0	2.3	2.3	4.1	4.1	6.4	6.4	4.8	4.8
Pan #70	0.0	0.0	0.9	0.9	1.1	1.1	2.2	2.2	1.5	1.5
PAN	0.0	100.0	0.3	0.3	0.2	0.2	0.2	0.2	0.3	0.3
Total	0.0	100.0	99.4	100.0	100.1	100.0	99.8	100.0	100.0	100.0
Retained	0.0%		98.5%		98.4%		97.5%		97.9%	

MT. MOVER

	COMP # 1	COMP # 2	COMP # 3	COMP # 4	COMP # 5	TOTAL
Sand Size	40/70	40/70	40/70	40/70	40/70	
Est. Amt. (sacks)	120	0	0	0	0	120
Amt. Pumped (sacks)	120	0	0	0	0	120
Amt. Returned (sacks)	0	0	0	0	0	0

SAND SIEVE ANALYSIS

40/70 SAND

Initial Weight(grams):	COMP 1		COMP 2		COMP 3		COMP 4		COMP 5	
Sand Type:	Wt	%	Wt	%	Wt	%	Wt	%	Wt	%
Pan #30	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pan #40	1.5	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pan #50	38.1	38.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pan #60	44.7	44.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pan #70	10.3	10.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pan #100	5.0	5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PAN	0.6	0.6	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0
Total	100.2	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0
Retained	92.9%		0.0%		0.0%		0.0%		0.0%	

Customer: Hillcorp Energy
 Well: Nazareus 16-8
 Date: 11/21/2011
 Formation: Niobrara
 Ticket #: 9074969

HALLIBURTON

TANK VOLUMES:

TANK:	1	2	3	4	5	6	7	8	9	10	11	12
Initial Strap Job (Inches)	92	92	90	90	92	95	97	92	96	99	93	95
Fluid Vol. (BBL)	440.0	440.0	430.0	430.0	440.0	455.0	465.0	440.0	460.0	475.0	445.0	455.0
Final Strap (Inches)	0	0	0	0	41	35	94	92	31	0	0	0
Fluid Vol. (BBL)	0.0	0.0	0.0	0.0	185.8	157.5	450.0	440.0	139.5	0.0	0.0	0.0

	Initial	Final	Used	Fluid in Trucks
Hydration Tank (Gallons)	2,000	2,000	0	0
Volume Pumped (Gallons)	227,750	59,658	168,092	

Total Fluid Pumped
168,092

LABORATORY WATER ANALYSIS

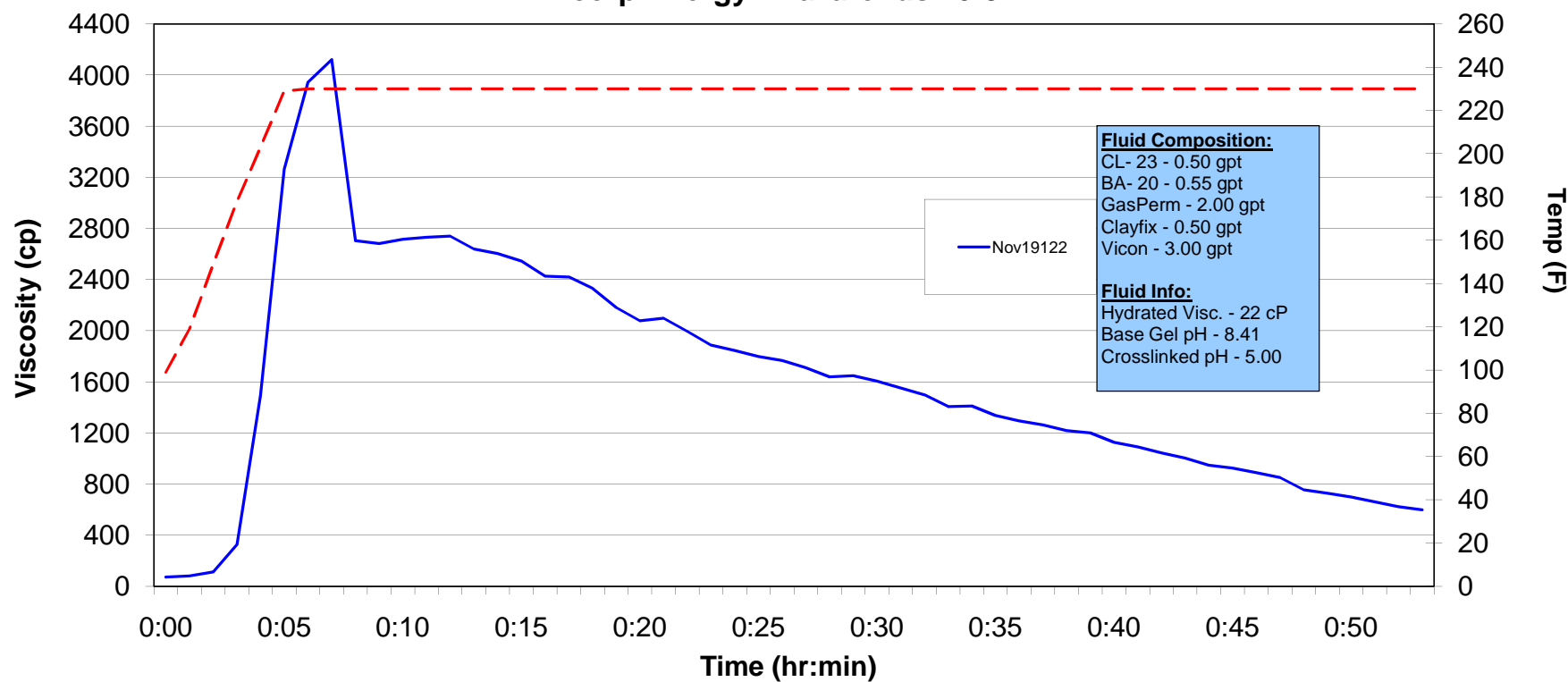
TANK:	1	2	3	4	5	6	7	8	9	10	11	12	Averages
Temperature (°F)	69.8	69.6	69.2	68.7	68.9	69.0	67.8	68.3	66.7	66.9	66.2	66.5	68.1
pH	7.91	7.88	7.89	7.87	7.83	7.86	7.91	7.94	7.94	7.93	7.93	7.97	7.9
Chlorides (mg/L):	<32	<32	54.00	<32	<32	<32	<32	<32	<32	<32	<32	<32	54.0
Potassium (mg/L):	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Sodium (mg/L):	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Sulfate (mg/L):	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
Iron (mg/L):	0.90	1.25	0.20	0.30	1.25	1.25	0.30	1.25	0.15	0.95	0.50	0.70	0.8
Bicarbonates (mg/L):	98	110	110	110	98	110	73	98	73	73	98	98	96
Reducing Agents (mg/L):	P	P	P	P	P	P	P	P	P	P	P	P	P
Total Hardness (mg/L):	90	90	90	80	80	70	50	50	80	60	50	40	69
Calcium (Ca) (mg/L):	72	72	72	64	64	56	40	40	40	48	40	32	53
Magnesium (Mg) (mg/L):	18	18	18	16	16	14	10	10	10	12	10	8	13
Phosphates (PO ₄) (mg/L):	5	5	5	5	5	5	5	5	5	5	5	5	5
Specific Gravity	1.000	1.000	1.000	1.000	0.999	0.999	0.999	0.999	0.999	0.999	0.999	1.000	1.0

PRE-JOB WATER ANALYSIS

TANK:	1	2	3	4	5	6	7	8	9	10	11	12	Avg
Temperature (°F)	70.4	69.4	72.2	72.7	72.2	70.8	71.0	70.5	69.4	67.4	68.2	71.1	70.4
pH	5.89	6.90	6.82	6.83	6.84	6.96	6.97	6.98	7.11	6.98	7.04	7.18	6.9
Specific Gravity	1.000	1.000	1.001	1.001	1.001	1.001	1.000	1.000	1.001	1.001	1.001	1.000	1.0

HALLIBURTON

**Brighton District Laboratory
Model 50 - pHaserFrac, Niobrara Design
Hilcorp Energy - Nazarenus 16-8**





Customer: Hillcorp Energy
Location: Nazareus 16-8
Formation Niobrara
Date: 11/21/2011

Test No: 2
QC Operator: L.Owens
Ticket No: 9074969

Fann 35 Analysis Data Sheet QC Field Test

Location Water
7.09 pH

Hydrated
8.63 pH

Buffered to
4.91 pH

Final
4.91 pH

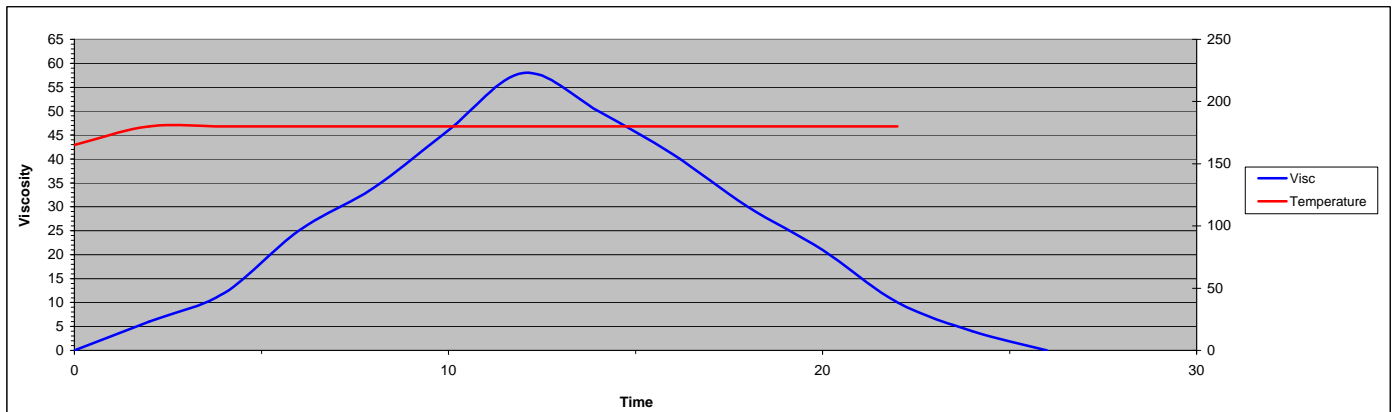
Crosslink Time	
Temperature	Time
160.00 °f	:56

Hydration Test		
Time	Visc.	Temp.
5	22	69
10	22	69
15	22	69

Test Increments:		2	minutes
Time (Min)	Temp (°F)	Fann35 (Dial)	Apparent Visc
0	160	0	0.0
2	160	6	152.4
4	165	12	304.8
6	180	25	635.0
8	180	34	863.6
10	180	46	1168.4
12	180	58	1473.2
14	180	50	1270.0
16	180	41	1041.4
18	180	30	762.0
20	180	21	533.4
22	180	10	254.0
24	180	4	101.6
26	180	0	0.0
28			
30			
32			
34			
36			
38			
40			
42			
44			
46			
48			
50			
52			
54			
56			
60% of Initial Reading			0

Fluid	pHaserFrac
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DRY GEL			
Submitted Location Water		1000	mL
setpoint:	22.00	WG-18	2.639 grams
Viscosity	22	cp	Temp 69.1 °f
Components are mixed in 1000 mLs of Hydrated Gel			
Chemicals			
Miscellaneous			
setpoint:			
Surfactants			
setpoint:	2.00	GasPerm 1100	2.00 mL
setpoint:			
setpoint:			
Clay Control / Stabilizers			
setpoint:	0.50	ClayWeb	0.50 mL
setpoint:			
Buffers			
setpoint:	0.30	BA-20	0.30 mL
setpoint:			
Crosslinkers			
Crosslinker Dilution: 1 0 3.5			
setpoint:	0.50	CL-23	0.07 mL
setpoint:			
setpoint:			
Breakers			
Hydrated Gel Used for Test:		200	mL
setpoint:	0.50	CAT-3	0.100 ml
setpoint:	3.00	VICON NF	2.500 ml
setpoint:			
setpoint:			
setpoint:			



Company: Hillcorp Energy

Lease: Nazarenus 16-8

Formation: Niobrara

pHaserFrac
CW 230 °F

Location: SESE Sec 8 T2S R64W

HALLIBURTON

Stage	Fluid Schedule	Volume (gal)	Proppant Type.	Prop Conc. (ppg)	Prop Total (lbs)	Slurry Vol. (gals)	Rate (bpm)	Stage Time (h:min:sec)	Exposure Time (h:min:sec)	CL-23 (gpt)	BA-20 (gpt)	GasPerm 1100 (gpt)	Cla-Web (gpt)	VICON NF (gpt)	CAT-3 (gpt)	FR-66 (gpt)	WG-18 (ppt)		
1	Load and Break	679				679	5	0:03:14	1:26:20										
	15% HCl Acid	750				750	5	0:03:34	1:23:06										
2	FR Water Pad	25200				25200	50	0:12:00	1:19:32			2.00	0.50	1.00		1.00			
3	FR Water	28982	Ottawa 40/70	0.25	7245.5	29310	50	0:13:57	1:07:32			2.00	0.50	1.00		1.00			
4	FR Water	24026	Ottawa 40/70	0.5	12013	24570	50	0:11:42	0:53:35			2.00	0.50	1.00		1.00			
5	pHaserFrac Pad	5023				5023	50	0:02:24	0:41:53	0.50	0.30	2.00	0.50	3.00			22.00		
6	pHaserFrac 22 visc	16261	Ottawa 30/50	1	16261	16997	50	0:08:06	0:39:29	0.50	0.35	2.00	0.50	3.00			22.00		
7	pHaserFrac 22 visc	20179	Ottawa 30/50	2	40358	22005	50	0:10:29	0:31:24	0.50	0.40	2.00	0.50	3.00			22.00		
8	pHaserFrac 22 visc	18053	Ottawa 30/50	3	54159	20504	50	0:09:46	0:20:55	0.50	0.55	2.00	0.50	3.00	0.25		22.00		
9	pHaserFrac 22 visc	12402	Ottawa 30/50	4	49608	14647	50	0:06:58	0:11:09	0.50	0.55	2.00	0.50	3.00	0.50		22.00		
10	pHaserFrac 22 visc	3594	CRC-20/40	4	14376	4244	50	0:02:01	0:04:10	0.50	0.55	2.00	0.50	3.00	0.50		22.00		
11	Flush	4523				4523	50	0:02:09	0:02:09			2.00	0.50	3.00					
								0:00:00											
Total Pump Time: 1:26																			
TOTAL FLUID:		159672 gal	Total Proppant:		194021	168451	Final Design Used			38	34	316	79	318	13	78	1661		
Pad+SLF+Flush:		158243 gal	Average Rate:					46.5 bpm											
Pad+SLF:		153720 gal	Treatment Down:					Casing			CL-23	BA-20	GasPerm 1100	Cla-Web	VICON NF	CAT-3	FR-66	WG-18	
Percent Pad:		54.1%	Abs. Min. HHP:					7,350 HHP			Loaded	52	47	401	104	403	21	103	2082

MAX PRESSURE: 6000 psi		S.G.: 0.9	
Anticipated Surface Pres:	5901 psi	T Perf	B Perf
Perforations: 112		Perf Zone #1	7,200
Dia. in: 0.42		Perf Zone #2	7,265
Calc. Perf Fric (psi): 19		Perf Zone #3	
Est. Well Bore Fric (psi): 2,500		Perf Zone #4	
WELL-BORE PATH			
4 1/2" 11.6		7200 ft	
		ft	
		ft	

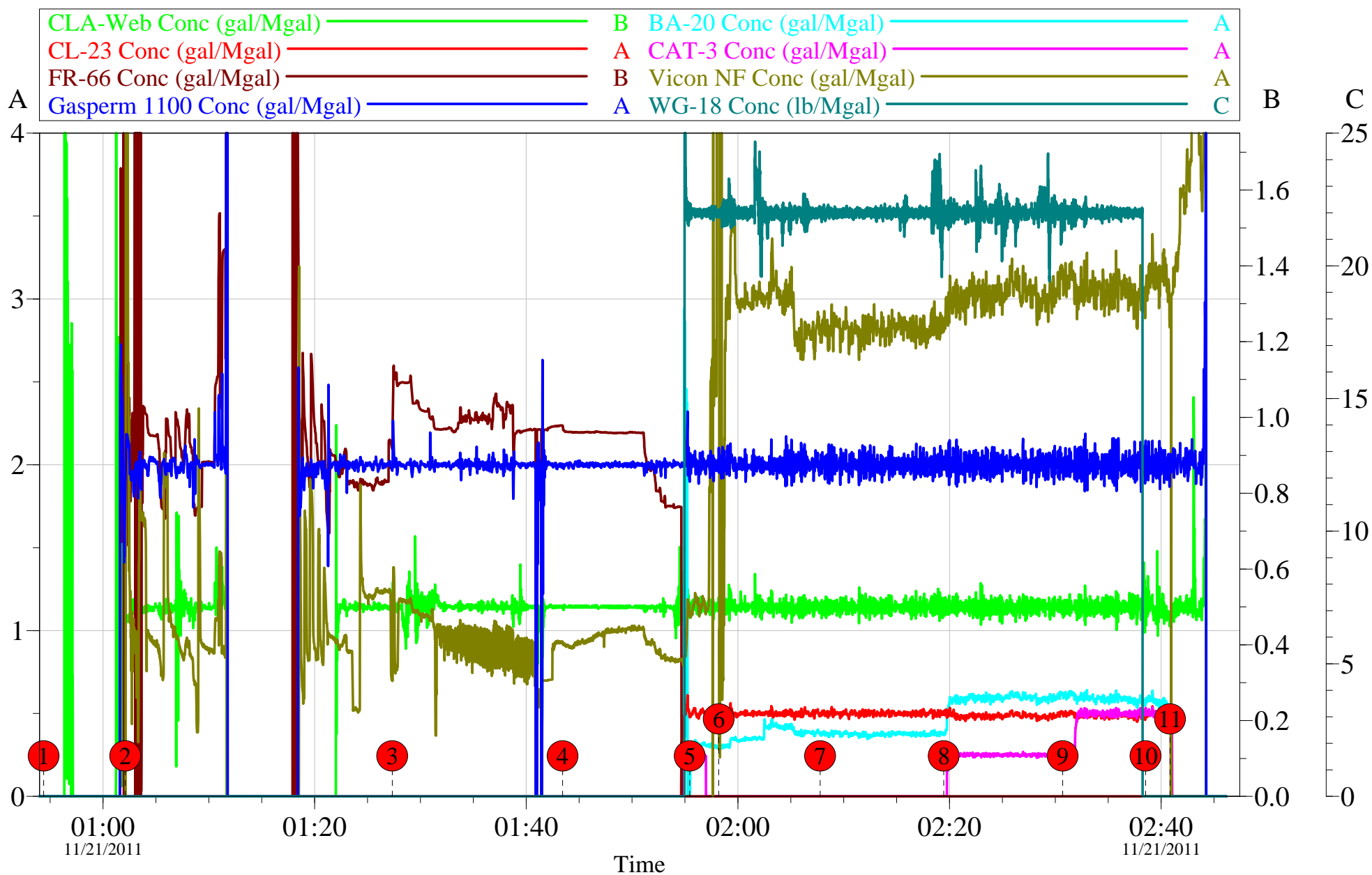
MAXIMUM CHEMICAL ADDITIVE								
Pump Rates (gal/min)		CL-23	BA-20	GasPerm 1100	Cla-Web	VICON NF	CAT-3	FR-66
50.0 bpm		1.050	1.155	4.202	1.050	6.303	1.050	2.101
Bucket Test Time for 1 gal (min:sec)		0.57	0.52	0.14	0.57	0.10	0.57	0.29
								0.01

HALLIBURTON

	Description	Units	Flowmeter	Strap	Gel	%					
	Water	GALS.	159,672	168092.4	0.0	-5.27					
Pump	Description	Units	Additive	Design	Actual	Beginning Prime Up End			Used	Design %	Actual %
0	Crosslinker	GALS.	CL-23	37.0	37.8	296	296	256.0	40	8.11%	5.94%
0	Buffer	GALS.	BA-20	74.0	34.0	286	286	250.0	36	51.35%	5.89%
0	Surfactant	GALS.	GasPerm 1100	310.0	316.5	617	617	330.0	287	7.42%	9.32%
0	Clay Control	GALS.	Cla-Web	77.5	79.1	233	233	154.0	79	1.94%	0.15%
0	Breaker	GALS.	VICON NF	522.0	318.3	940	940	614.0	326	37.55%	2.41%
0	Breaker/Catalyst	GALS.	CAT-3	20.2	12.5	109	109	96.0	13	35.48%	3.91%
0	Friction Reducer	GALS.	FR-66	76.0	78.2	230	230	155.0	75	1.32%	4.10%
0	Dry Additive	LBS.	WG-18	1924.0	1661.3	4904	4904	2100.0	2804	45.74%	68.79%
	Proppant	LBS.	Total Sand	200750	194021	201420	201420	0	201420	0.33%	3.81%
Notes:											

Chemical Plot

Nazareus 16-8 - Niobrara



Customer: HILCORP ENERGY
Well Description: Nazareus 16-8

Job Date: 20-Nov-2011
UWI: 05-001-09309

Sales Order #: 9074969

HALLIBURTON
INSITE for Stimulation v4.1.3
21-Nov-11 02:46

BULK SAND WEIGHTS

CUSTOMER: Hillcorp Energy

LEASE: Nazareus 16-8

FORMATION: Niobrara

JOB TOTAL: 18820 #Ottawa 40/70
170600 #Ottawa 30/50
12000 #SB Excel

DATE: 11/21/2011

CARRIER: Unimin Corporation

TRUCK NO.	BILL OF LANDING	WEIGHT
40/70	14849	18820
30/50	100862	43640
30/50	100859	39160
30/50	100861	45280
30/50	100860	42520

TOTAL 189420

TOTAL SACKS 1894

HILCORP ENERGY
1201 LOUISIANA SUITE 1400
HOUSTON, TX 77002

Nazarene 16-8

Interval 1
Adams County, Colorado

Sales Order: 9074969

Post Job Report

For: JEFF SCHNEIDER
Date: Sunday, November 20, 2011

Notice: Although the information contained in this report is based on sound engineering practices, the copyright owner(s) does (do) not accept any responsibility whatsoever, in negligence or otherwise, for any loss or damage arising from the possession or use of the report whether in terms of correctness or otherwise. The application, therefore, by the user of this report or any part thereof, is solely at the user's own risk.

HALLIBURTON

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1.0 EXECUTIVE SUMMARY

JEFF SCHNEIDER
HILCORP ENERGY
1201 LOUISIANA SUITE 1400
HOUSTON , TX 77002

Dear JEFF SCHNEIDER,

Halliburton appreciates the opportunity to perform the stimulation treatment on the Nazarenus 16-8. A pre-job safety meeting was held where details of the job were discussed, potential safety hazards were reviewed, and environmental compliance procedures were outlined. Pump time was 103.87 min.

The proposed treatment for Nazarenus 16-8 - Niobrara Stage consisted of:

- 750 gal of FR-56 WATER - SBM (467131).
- 25000 gal of FR-66 Water.
- 51000 gal of FR-66 Water carrying 187.50 100*lb of SAND - PREMIUM - 40/70, BULK, SK (100064018).
- 5000 gal of pHaserFrac (22).
- 69000 gal of pHaserFrac (22) carrying 1700.00 100*lb of SAND - PREMIUM - 30/50, BULK, SK (100009377).
- 3000 gal of pHaserFrac (22) carrying 120.00 100*lb of SAND-CRC-20/40, BULK (101357947).
- 5000 gal of Treated Water.

The treatment actually pumped consisted of:

- 1429 gal of FR-56 WATER - SBM (467131).
- 25200 gal of FR-66 Water.
- 53008 gal of FR-66 Water carrying 152.53 100*lb of SAND - PREMIUM - 40/70, BULK, SK (100064018).
- 5023 gal of pHaserFrac (22).
- 66895 gal of pHaserFrac (22) carrying 1575.87 100*lb of SAND - PREMIUM - 30/50, BULK, SK (100009377).
- 3594 gal of pHaserFrac (22) carrying 116.44 100*lb of SAND-CRC-20/40, BULK (101357947).
- 4523 gal of Treated Water.

The average BH treating rate was 42.0 bpm and average WH pressure was 3392 psi.

The total liquid load to recover is 159673 gal.

Halliburton is strongly committed to quality control on location. Before and after each job all chemicals, proppants, and fluid volumes are measured to assure the highest level of quality control. Tank fluid analysis, crosslink time, and break tests are performed before each job in order to optimize the performance of the treatment fluids.

Halliburton maintains a continuous quality improvement process and appreciates any comments or suggestions that you may have. Halliburton again thanks you for the opportunity to perform service work on this well. We hope to be your solutions provider for future projects.

Respectfully,

NUCE

2.0 WELL INFORMATION

2.1 Customer Information

Customer	HILCORP ENERGY
Sales Order	9074969
Well Name	Nazarenus
Interval	1
Well Number	16-8
Job Date	20-Nov-2011
County	Adams
State	Colorado
UWI/API	05-001-09309
Lease Name	Nazarenus
Country	United States of America
H2S Present	Unknown
Customer Representative	JEFF SCHNEIDER
Halliburton Representative	NUCE

2.2 Pipe Information

Equipment	Top MD ft	Bottom MD ft	OD in	ID in	Weight lb/ft
Surface Pipe	0.0	0.1	5.000	4.000	
Casing	0.0	10000.0	4.500	4.000	11.60

3.0 PUMPING SCHEDULE

3.1 Designed Pumping Schedule

Stage Number	Description	Flow Path	Fluid System	Clean Volume gal	Slurry Volume gal	Prop Conc Start lb/gal	Prop Conc End lb/gal
1	Pad	In	FR-56 WATER - SBM (467131)	750	750	0.00	0.00
2	Pad	In	FR-66 Water	25000	25138	0.00	0.00
3	Proppant Laden Fluid	In	FR-66 Water	27000	27454	0.25	0.25
4	Proppant Laden Fluid	In	FR-66 Water	24000	24675	0.50	0.50
5	Pad	In	pHaserFrac (22)	5000	5046	0.00	0.00
6	Proppant Laden Fluid	In	pHaserFrac (22)	16000	16870	1.00	1.00
7	Proppant Laden Fluid	In	pHaserFrac (22)	20000	21992	2.00	2.00
8	Proppant Laden Fluid	In	pHaserFrac (22)	18000	20608	3.00	3.00
9	Proppant Laden Fluid	In	pHaserFrac (22)	15000	17852	4.00	4.00
10	Proppant Laden Fluid	In	pHaserFrac (22)	3000	3578	4.00	4.00
11	Flush	In	Treated Water	5000	5013	0.00	0.00
Total				158750	168974		

3.2 Designed Pumping Schedule (continued)

Stage Number	Description	Prop Type	Prop Mass 100*lb	Rate Stage Start bpm	Rate Stage End bpm	Stage Time min
1	Pad			5.0	5.0	3.57
2	Pad			50.0	50.0	11.97
3	Proppant Laden Fluid	SAND - PREMIUM - 40/70, BULK, SK (100064018)	67.50	50.0	50.0	13.07
4	Proppant Laden Fluid	SAND - PREMIUM - 40/70, BULK, SK (100064018)	120.00	50.0	50.0	11.75
5	Pad			50.0	50.0	2.40
6	Proppant Laden Fluid	SAND - PREMIUM - 30/50, BULK, SK (100009377)	160.00	50.0	50.0	8.03
7	Proppant Laden Fluid	SAND - PREMIUM - 30/50, BULK, SK (100009377)	400.00	50.0	50.0	10.47
8	Proppant Laden Fluid	SAND - PREMIUM - 30/50, BULK, SK (100009377)	540.00	50.0	50.0	9.81
9	Proppant Laden Fluid	SAND - PREMIUM - 30/50, BULK, SK (100009377)	600.00	50.0	50.0	8.50
10	Proppant Laden Fluid	SAND-CRC-20/40, BULK (101357947)	120.00	50.0	50.0	1.70
11	Flush			20.0	20.0	5.97
Total			2007.50			87.26

3.3 Designed Liquid Additive Schedule

Stage Number	Gasperm 1100			CLA-Web			FR-66		
	Conc Start gal/Mgal	Conc End gal/Mgal	Vol gal	Conc Start gal/Mgal	Conc End gal/Mgal	Vol gal	Conc Start gal/Mgal	Conc End gal/Mgal	Vol gal
1									
2	2.000	2.000	50.000	0.500	0.500	12.500	1.000	1.000	25.000
3	2.000	2.000	54.000	0.500	0.500	13.500	1.000	1.000	27.000
4	2.000	2.000	48.000	0.500	0.500	12.000	1.000	1.000	24.000
5	2.000	2.000	10.000	0.500	0.500	2.500			
6	2.000	2.000	32.000	0.500	0.500	8.000			
7	2.000	2.000	40.000	0.500	0.500	10.000			
8	2.000	2.000	36.000	0.500	0.500	9.000			
9	2.000	2.000	30.000	0.500	0.500	7.500			
10	2.000	2.000	6.000	0.500	0.500	1.500			
11	2.000	2.000	10.000	0.500	0.500	2.500			
Total			316.000			79.000			76.000

3.4 Designed Liquid Additive Schedule

Stage Number	Vicon NF			CL-37			CL-23		
	Conc Start gal/Mgal	Conc End gal/Mgal	Vol gal	Conc Start gal/Mgal	Conc End gal/Mgal	Vol gal	Conc Start gal/Mgal	Conc End gal/Mgal	Vol gal
1									
2	2.000	2.000	50.000						
3	2.000	2.000	54.000						
4	2.000	2.000	48.000						
5	5.000	5.000	25.000	0.500	0.500	2.500	1.000	1.000	5.000
6	5.000	5.000	80.000	0.500	0.500	8.000	1.000	1.000	16.000
7	5.000	5.000	100.000	0.500	0.500	10.000	1.000	1.000	20.000
8	5.000	5.000	90.000	0.500	0.500	9.000	1.000	1.000	18.000
9	5.000	5.000	75.000	0.500	0.500	7.500	1.000	1.000	15.000
10	5.000	5.000	15.000	0.500	0.500	1.500	1.000	1.000	3.000
11									
Total			537.000			38.500			77.000

3.5 Designed Liquid Additive Schedule

	BA-20		
Stage Number	Conc Start gal/Mgal	Conc End gal/Mgal	Vol gal
1			
2			
3			
4			
5	0.150	0.150	0.750
6	0.150	0.150	2.400
7	0.150	0.150	3.000
8	0.250	0.250	4.500
9	0.250	0.250	3.750
10	0.500	0.500	1.500
11			
Total			15.900

3.6 Designed Dry Additive Schedule

	WG-18		
Stage Number	Conc Start lb/Mgal	Conc End lb/Mgal	Mass lb
1			
2			
3			
4			
5	26.00	26.00	130.00
6	26.00	26.00	416.00
7	26.00	26.00	520.00
8	26.00	26.00	468.00
9	26.00	26.00	390.00
10	26.00	26.00	78.00
11			
Total			2002.00

4.0 ACTUAL STAGE SUMMARY

4.1 Stage Summary

Stage Number	Stage Time	Start Time	End Time	Time min	Pump Time min	Max Treat Pr psi	Max Slurry Rate bpm
1	21-Nov-11 01:02:05	00:54:23	21-Nov-11 01:02:05	7.71	7.65	2971	13.9
2	21-Nov-11 01:27:19	01:02:06	21-Nov-11 01:27:19	25.24	19.32	3929	47.4
3	21-Nov-11 01:43:25	01:27:20	21-Nov-11 01:43:25	16.10	16.10	3558	47.9
4	21-Nov-11 01:55:25	01:43:26	21-Nov-11 01:55:25	12.00	12.00	4012	57.1
5	21-Nov-11 01:58:10	01:55:26	21-Nov-11 01:58:10	2.75	2.75	4007	46.2
6	21-Nov-11 02:07:45	01:58:11	21-Nov-11 02:07:45	9.58	9.58	3914	47.1
7	21-Nov-11 02:19:26	02:07:46	21-Nov-11 02:19:26	11.68	11.68	3808	48.0
8	21-Nov-11 02:30:40	02:19:27	21-Nov-11 02:30:40	11.23	11.23	3708	46.1
9	21-Nov-11 02:38:30	02:30:41	21-Nov-11 02:38:30	7.83	7.83	3652	47.5
10	21-Nov-11 02:40:49	02:38:31	21-Nov-11 02:40:49	2.32	2.32	3602	45.6
11	21-Nov-11 03:00:43	02:40:50	21-Nov-11 03:00:43	19.90	3.40	3348	43.1

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	21-Nov-11 01:02:05	13.9	0.72	0.73	2283	4.4	4.5
2	21-Nov-11 01:27:19	47.4	0.37	0.37	3307	31.0	31.0
3	21-Nov-11 01:43:25	47.9	0.48	0.48	3422	42.9	43.2
4	21-Nov-11 01:55:25	57.1	0.55	0.55	3551	47.7	48.5
5	21-Nov-11 01:58:10	46.2	0.10	0.10	3821	43.5	43.5
6	21-Nov-11 02:07:45	47.1	1.79	1.79	3621	40.4	42.2
7	21-Nov-11 02:19:26	48.0	2.63	2.63	3645	41.1	45.0
8	21-Nov-11 02:30:40	46.1	3.90	3.90	3507	38.3	43.4
9	21-Nov-11 02:38:30	47.5	5.87	5.87	3517	37.7	44.2
10	21-Nov-11 02:40:49	45.6	3.55	3.55	3442	37.0	42.4
11	21-Nov-11 03:00:43	43.1	2.72	4714.24	3079	31.7	32.1

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	21-Nov-11 01:02:05	4.5	0.51	251	1429	1450	1450
2	21-Nov-11 01:27:19	31.0	0.08	2514	25200	25203	25203
3	21-Nov-11 01:43:25	43.2	0.19	3625	28982	29232	29232
4	21-Nov-11 01:55:25	48.5	0.41	4224	24026	24466	24466
5	21-Nov-11 01:58:10	43.5	0.02	4073	5023	5024	5024
6	21-Nov-11 02:07:45	42.2	0.98	3743	16261	16978	16978
7	21-Nov-11 02:19:26	45.0	2.06	4016	20179	22056	22056
8	21-Nov-11 02:30:40	43.4	2.95	3725	18053	20456	20456
9	21-Nov-11 02:38:30	44.2	3.81	3807	12402	14532	14532
10	21-Nov-11 02:40:49	42.4	3.24	3580	3594	4128	4128
11	21-Nov-11 03:00:43	32.1	71.56	2422	4523	4584	4584
Total					159673	168108	168108

Stage Number	Stage Time	Prop Mass 100*lb
1	21-Nov-11 01:02:05	4.44
2	21-Nov-11 01:27:19	0.84
3	21-Nov-11 01:43:25	55.39
4	21-Nov-11 01:55:25	97.14
5	21-Nov-11 01:58:10	0.26
6	21-Nov-11 02:07:45	158.60
7	21-Nov-11 02:19:26	414.93
8	21-Nov-11 02:30:40	531.32
9	21-Nov-11 02:38:30	471.02
10	21-Nov-11 02:40:49	116.44
11	21-Nov-11 03:00:43	13.13
Total		1863.51

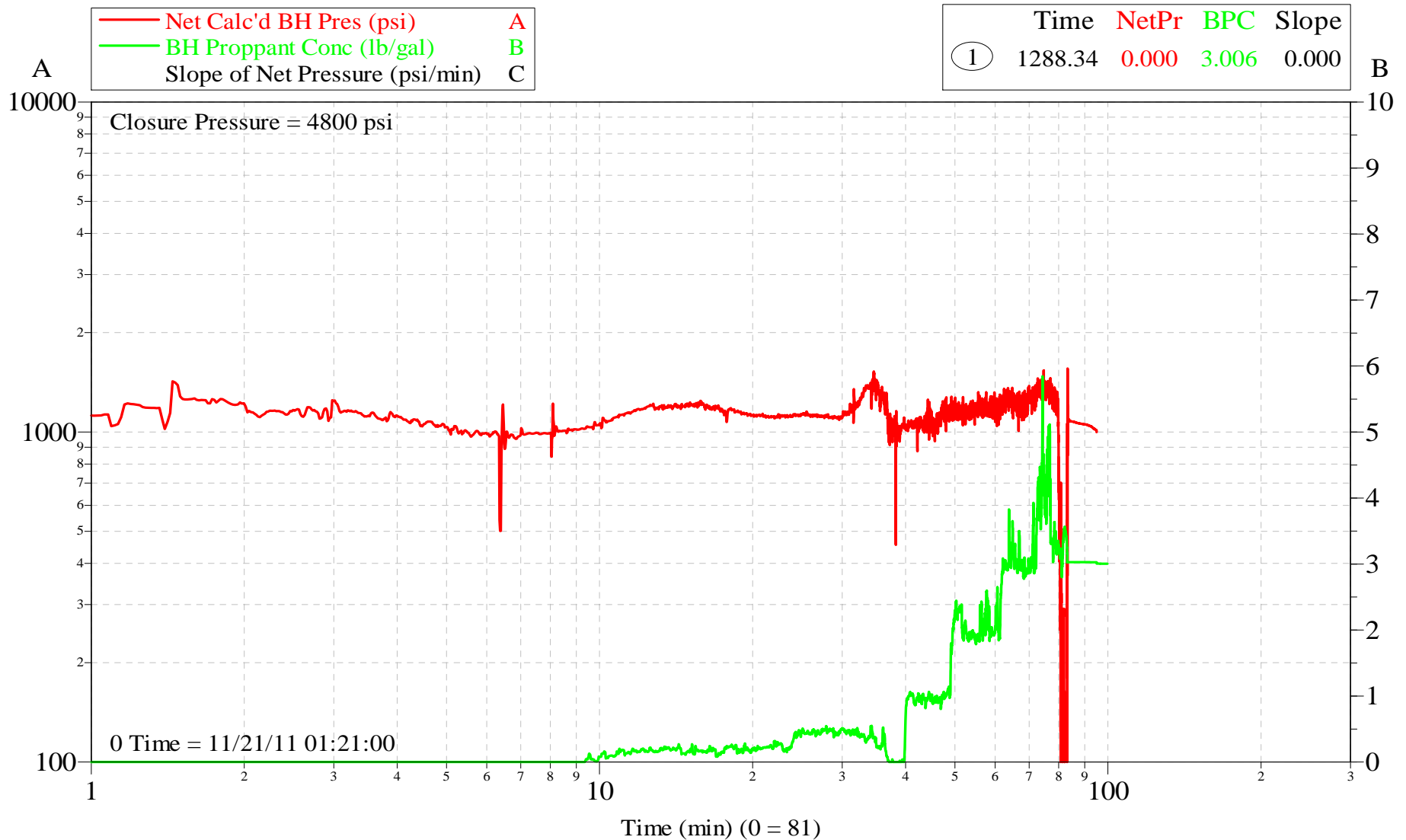
5.0 PERFORMANCE HIGHLIGHTS

5.1 Job Stage Log

Time	Description	Comment
21-Nov-11 00:54:23	Stage 1	Pad
01:02:06	Stage 2	Pad
01:27:20	Stage 3	Proppant Laden Fluid
01:43:26	Stage 4	Proppant Laden Fluid
01:55:26	Stage 5	Pad
01:58:11	Stage 6	Proppant Laden Fluid
02:07:46	Stage 7	Proppant Laden Fluid
02:19:27	Stage 8	Proppant Laden Fluid
02:30:41	Stage 9	Proppant Laden Fluid
02:38:31	Stage 10	Proppant Laden Fluid
02:40:50	Stage 11	Flush

Net Pressure Plot

Nazarenus 16-8 - Niobrara



Customer: HILCORP ENERGY
Well Description: Nazarenus 16-8

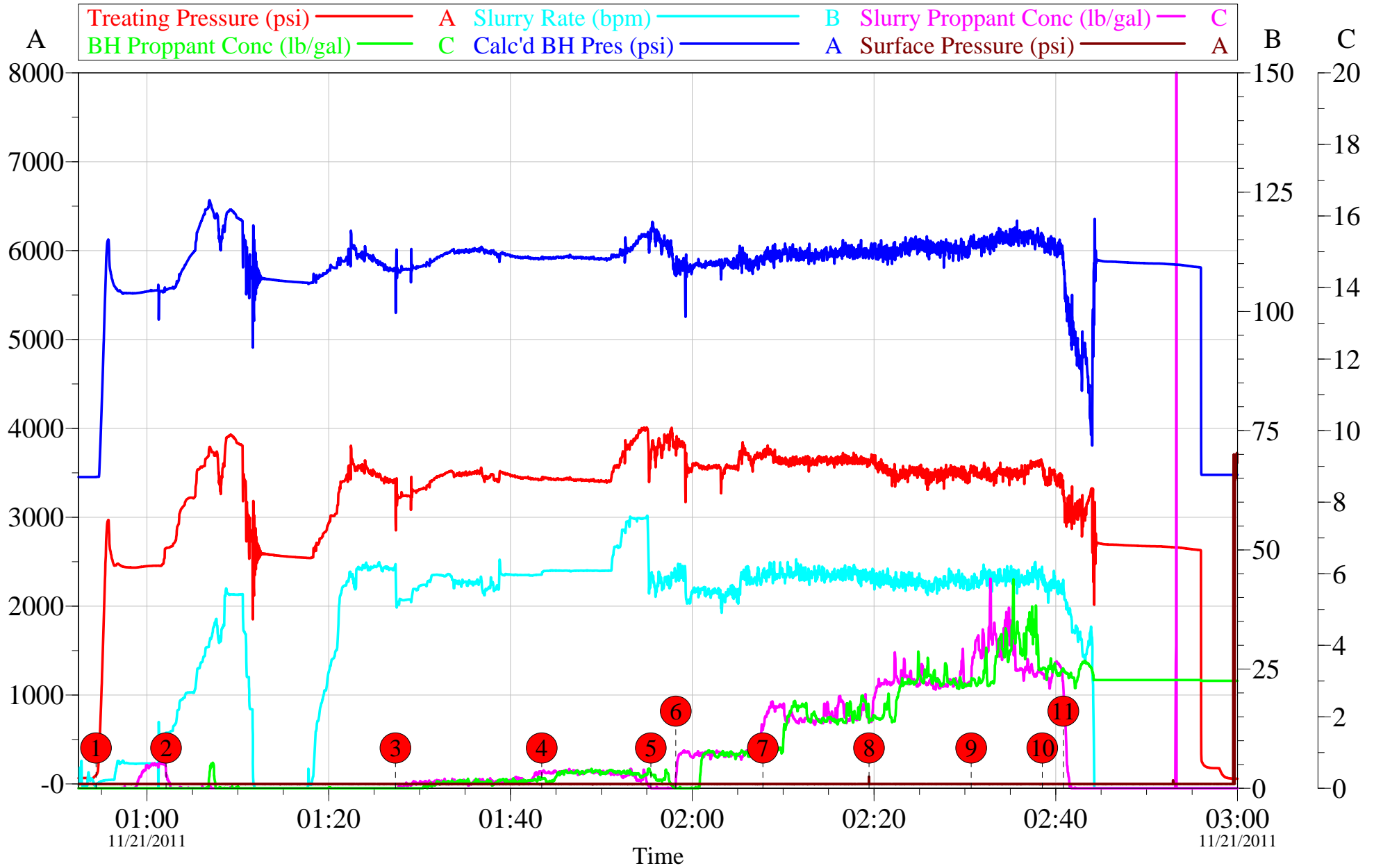
Job Date: 20-Nov-2011
UWI: 05-001-09309

Sales Order #: 9074969

HALLIBURTON
INSITE for Stimulation v4.1.3
21-Nov-11 03:08

Treatment Plot

Nazarenus 16-8 - Niobrara



Customer: HILCORP ENERGY
Well Description: Nazarenus 16-8

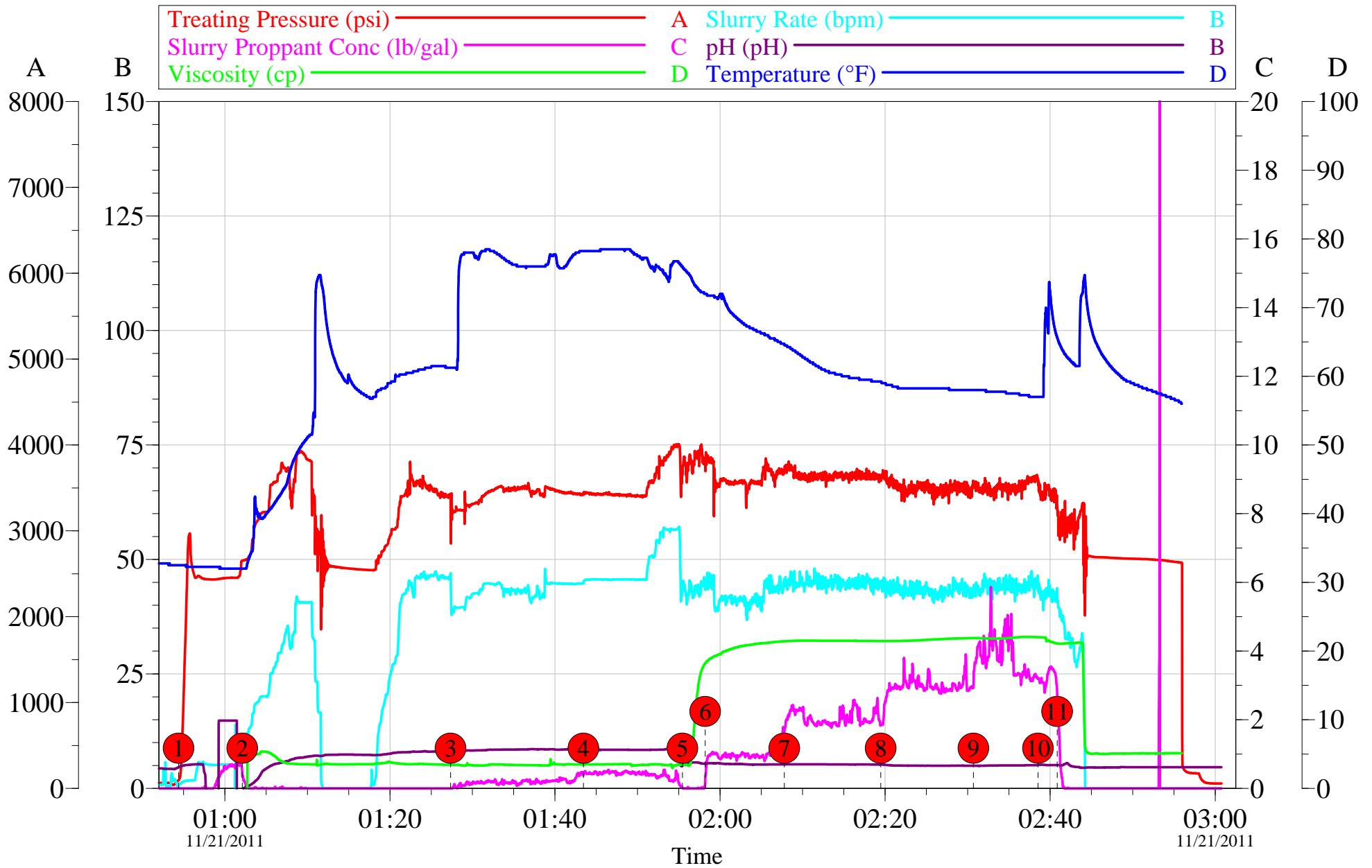
Job Date: 20-Nov-2011
UWI: 05-001-09309

Sales Order #: 9074969

HALLIBURTON
INSITE for Stimulation v4.1.3
21-Nov-11 03:08

QAQC Plot

Nazarenus 16-8 - Niobrara



Customer: HILCORP ENERGY
Well Description: Nazarenus 16-8

Job Date: 20-Nov-2011
UWI: 05-001-09309

Sales Order #: 9074969

HALLIBURTON
INSITE for Stimulation v4.1.3
21-Nov-11 03:08

HALLIBURTON				JOB SUMMARY				TICKET #		*9074969									
COUNTRY UNITED STATES				LOCATION BRIGHTON, COLORADO				BDA ROCKIES NWA		TICKET DATE 21-Nov-2011									
H.E.S. EMPLOYEE NAME MIKE NUCE				MBU ID N/A		EMP NO. 446133		SUB PSL PRODUCTION ENHANCEMENT											
CUSTOMER REP GARY CHANDLER				COMPANY HILLCORP				JOB PURPOSE CODE 15321											
WELL NAME NAZARENUS		WELL NO. 16-8		API/UNI # 05-001-09309				COUNTRY WELD		JOB CLASSIFICATION pHaserFrac									
WELL LOCATION COMMERCE CITY, CO				SEC / TWP / RNG SEC 8 / T2S / R64W				DEPARTMENT NO. 5005		FORMATION NIOBRARA									
H.E.S. EMP NAME / EMP # / (EXPOSURE HOURS)										HRS									
16 H.E.S. EMPLOYEES										9.0									
SEE ATTCH. SHEET																			
H.E.S. UNIT #S / (R / T MILES)										R / T MILES									
14 FRAC. UNITS										SEE ATTCH. SHEET									
1 PICKUPS																			
Form. Name NIOBRARA Type: LIME STONE																			
Form. Thickness 88 From 7,200 to 7,288																			
Packer Type Set At																			
Bottom Hole Temp. Pressure																			
Retainer Depth Total Depth																			
Tools and Accessories										Well Data									
Type and Size		Qty		Make		New/Used		Weight		Size Grade		From		To		Max. Allow			
Float Collar						Casing		USED		11.6		4112		0		6,216			
Float Shoe						Casing										5,000			
Centralizers						Liner													
Top Plug						Tubing													
Packer						Tubing													
DV Tool						Open Hole										PERFS			
Insert Float						Perforations						7,200		7,220		112			
Guide Shoe						Perforations						7,265		7,288					
Other						Perforations													
Materials										Hours On Location		Operating Hours		Description of Job					
Fluid Type		pHaserFrac		Density				Date		Hours		Date		Hours		SEE JOB LOG DESCRIPTION			
Disp. Fluid		H2O		Density		8.34		11/21		9.0		11/21		1.5					
Prop. Type		OTTAWA		Size		20/40													
Prop. Type		OTTAWA		Size		40/70													
Proppant Type		CRC		Gal.		20/40													
Crosslinker		CL-23		Gal.		40													
Surfactant		GP 1100		Gal.		287													
Surfactant				Gal.															
Buffer		BA-20		Gal.		36													
Claycontrol		Clay Web		Gal.		79													
Gelling Agent		WG-18		LBS.		2,804													
Breaker		VICON NF		Lb		326													
Breaker		CAT-3		Lb		13													
Breaker		BE-3S		Lb		36													
Breaker				Lb															
Stabilizer		FR-66		Lb		75													
Acid		15%		Gal.		750													
Other		HAI		Gal.		2													
Other																			
Other																			
Other																			
Perfpac Balls																			
Ordered 10000										Hydraulic Horsepower		Avail. 11500		Used 3863					
Treating 44.5										Average Rates in BPM		Disp. 44.5		Overall 57 57.1					
PRESSURES																			

HALLIBURTON										JOB LOG										*9074969	
COUNTRY UNITED STATES					LOCATION BRIGHTON, COLORADO					BDA ROCKIES NWA					TICKET DATE 21-Nov-2011						
H.E.S. EMPLOYEE NAME MIKE NUCE					MBU ID N/A					EMP NO. 446133					SUB PSL PRODUCTION ENHANCEMENT						
CUSTOMER REP. / PHONE GARY CHANDLER					COMPANY HILLCORP					JOB PURPOSE CODE 15321											
WELL NAME STATE OF CO					WELL NO. AB1					API/UMI # 05-001-09309					COUNTRY WELD						
WELL LOCATION COMMERCE CITY, CO					SEC / TWP / RNG SEC 8 / T2S / R64W					DEPARTMENT NO. 5005					JOB CLASSIFICATION pHaserFrac						
Chart No.		Time	Rate (BPM)	Volume (BBL)(GAL)	Pmps T C		Press.(PSI) Tbg Csg		Job Description / Remarks												
		8:00 AM							CALLED OUT												
		9:00AM							YARD SAFETY MEETING												
		9:00 PM							ON LOCATION												
		9:10 PM							PRE - RIGUP SAFETY MEETING												
		11:00 PM							PRIME UP TRUCKS												
		11:35 PM							TEST LINES 7017 MAX PRESSURE AT 6000#												
									POP OFFS AT 5012												
									BACKSIDE POP OFF SET AT N/A BACKSIDE AT N/A												
		11:37 PM							PRE - JOB SAFETY MEETING												
		11:53 PM							START JOB WITH ACID												
									START FR PAD												
		11:56 PM	1.8					2971	BREAK FORMATION												
									START ACID												
		12:02 AM	11.6	34				2654	START FR WATER PAD												
		12:12 AM							SHUTDOWN ISIP 2822 5 MIN. 2833												
		12:17 AM						2542	RESUME FR WATER PAD UP TO RATE												
		12:27 AM	46.9	634				3415	START .25 PPG FR WATER STAGE												
									0.25 PPG ON FORMATION												
		12:43 PM	44.8	1325				3437	START .5 PPG FR WATER STAGE												
									.5 PPG ON FORMATION												
		12:55 AM	44.9	1897				3651	START PHASER PAD												
		12:58 AM	43.4	2016				3818	START 1 PPG SAND STAGE												
		1:00 AM	41.2	2127				3568	1 PPG SAND ON FORMATION												
		1:08 AM	44.7	2404				3693	START 2 PPG SAND STAGE												
		1:10 AM	47.3	2515				3620	2 PPG SAND ON FORMATION												
		1:19 AM	44.9	2884				3609	START 3 PPG SAND STAGE												
		1:22 AM	41.9	2995				3529	3 PPG SAND ON FORMATION												
		1:31 AM	42.2	3314				3546	START 4 PPG SAND STAGE												
				3425					4 PPG SAND ON FORMATION												
		1:38 AM	43.3	3609				3602	START 2ND 4PPG SAND STAGE												
		1:40 PM	43.3	3695				3300	FLUSH												
		2:18 AM		3801				2957	JOB COMPLETED												
									AVERAGES :					SHUTIN PRESSURES :							
									PRESSURE		3542			INSTANT		2957					
									RATE		44.5			5 MIN		2678					
									TEMP		66.3			10 MIN		N/A					
									VIS.		20.5			15 MIN		N/A					
									MAX :					TOTAL VOLUME					3801		
									PRESSURE		4012			FLUSH VOLUME					108		
									RATE		57.1										