



Terra Energy Partners

Well Name: FEDERAL #PA 434-13

API #: 05-045-24205

Job Type: Production

Date Job Completed: 6/7/2020

Quote #: QUO-45509

Execution #: EXC-26229



Terra Energy Partners

Attention: Mr. Lynn Cass | (970) 263-2716 | LCass@terraep.com

Terra Energy Partners | 4828 Loop Central Dr., Suite 900 | Houston, TX 77081

Dear Mr. Cass,

Thank you for the opportunity to provide cementing services on this well. BJ Services strives to achieve complete customer satisfaction. If you have any questions regarding the services or data provided, please contact BJ Services at any time.

Sincerely,

Zen Keith
Field Engineer | (307) 757-7178 | zen.keith@bjservices.com

Field Office 28730 US-6, Rifle, CO 81650
Phone: (970) 632-2412

Sales Office 999 18th St. Suite 1200 Denver, CO 80202
Phone: (281) 408-2361

BJ Cementing Treatment Report

SERVICE SUPERVISOR	Douglas Diaz	FORMATION	
CLIENT FIELD REPRESENTATIVE	Craig Borgstede	RIG	H&P 318
DISTRICT	Rifle, CO	COUNTY	GARFIELD
SERVICE	Cementing	STATE / PROVINCE	CO

WELL GEOMETRY

TYPE	ID (in)	OD (in)	WEIGHT (lb/ft)	MD (ft)	EXCESS (%)	GRADE	THREAD
Previous Casing	8.92	9.63	36.00	1,100.00		J-55	ST&C
Open Hole	8.75			9,857.00	45.00		
Casing	4.00	4.50	11.60	9,847.00		P-110	LT&C

HARDWARE

Bottom Plug Used?	No	Tool Type	Float Collar
Top Plug Used?	Yes	Tool Depth (ft)	1,816.00
Top Plug Provided By	Non BJ	Max Casing Pressure - Rated (psi)	10690.00
Top Plug Size	4.500	Max Casing Pressure - Operated (psi)	8552.00
Centralizers Used	Yes	Pipe Movement	Reciprocation
Centralizers Type	Bow	Job Pumped Through	Manifold
Landing Collar Depth (ft)	9,816	Top Connection Thread	1502
		Top Connection Size	4.5

CIRCULATION PRIOR TO JOB

Well Circulated By	Rig	Solids Present at End of Circulation	No
Circulation Prior to Job	Yes	Flare Prior to / during the Cement Job	No
Circulation Time (min)	90.00	Gas Present	No
Circulation Rate (bpm)	11.00		
Circulation Volume (bbls)	990.00		
Lost Circulation Prior to Cement Job	No		
Mud Density In (ppg)	10.30		

TEMPERATURE

Ambient Temperature (°F)	78.00	Slurry Cement Temperature (°F)	71.00
Mix Water Temperature (°F)	71.00	Flow Line Temperature (°F)	

FLUID DETAILS

FLUID TYPE	FLUID NAME	DENSITY (ppg)	YIELD (Cu Ft/sk)	H ₂ O REQ (gals/sk)	PLN TOP FLD (ft)	LENGTH (ft)	VOL (sk)	VOL (Cu Ft)	VOL (bbls)
Spacer	Water	8.3000			5,736.00				10.0000
Spacer	Mud Flush	8.4000			5,896.00				20.0000
Spacer	Water	8.3000			5,866.00				10.0000
Lead Slurry	BJCem P100.3.02R	12.7000	1.9801	11.09	5,918.00	1,024.00	231	457.0000	81.2000
Tail Slurry	BJCem P70.6.01R	13.5000	1.8305	9.11	6,942.00	2,947.00	720	1317.0000	234.4000
Displacement	Displacement	8.3000			0.00			0.0000	153.0000

FLUID TYPE	FLUID NAME	COMPONENT	CONCENTRATION	UOM
Spacer	Mud Flush	MUD REMOVAL, SAPP	10.0000	PPB
Spacer	Mud Flush	SPACER SURFACTANT, SS-201	0.5000	GPB
Lead Slurry	BJCem P100.3.02R	DISPERSANT, CD-31	0.1000	BWOB
Lead Slurry	BJCem P100.3.02R	RETARDER, R-3	0.4000	BWOB
Lead Slurry	BJCem P100.3.02R	FLUID LOSS, FL-66	0.5000	BWOB
Lead Slurry	BJCem P100.3.02R	IntegraGuard GW-86	0.1000	BWOB
Lead Slurry	BJCem P100.3.02R	IntegraSeal POLI	0.2500	LBS/SK
Lead Slurry	BJCem P100.3.02R	FOAM PREVENTER, FP-25	0.3000	BWOB
Lead Slurry	BJCem P100.3.02R	CEMENT, ASTM TYPE III	100.0000	PCT
Tail Slurry	BJCem P70.6.01R	CEMENT, CLASS G	70.0000	PCT
Tail Slurry	BJCem P70.6.01R	EXTENDER, BENTONITE	6.0000	BWOB
Tail Slurry	BJCem P70.6.01R	SAND, S-8, Silica Flour, 200 Mesh	25.0000	BWOB
Tail Slurry	BJCem P70.6.01R	RETARDER, R-3	0.4000	BWOB
Tail Slurry	BJCem P70.6.01R	IntegraSeal POLI	0.2500	LBS/SK

FLUID TYPE	FLUID NAME	COMPONENT	CONCENTRATION	UOM
Tail Slurry	BJCem P70.6.01R	CEMENT, FLY ASH (POZZOLAN)	20.0000	PCT
Tail Slurry	BJCem P70.6.01R	BONDING AGENT, BA-90	10.0000	PCT
Tail Slurry	BJCem P70.6.01R	FLUID LOSS, FL-24	0.4000	BWOB
Tail Slurry	BJCem P70.6.01R	FOAM PREVENTER, FP-25	0.3000	BWOB

TREATMENT SUMMARY

TIME	FLUID	RATE (bpm)	FLUID VOL (bbls)	PIPE PRESS (psi)	ANNULUS PRESS (psi)	COMMENTS
6/7/2020 2:45:00 PM	Water	7.00	10.00	1298.00		
6/7/2020 2:34:00 PM	Mud Flush	5.00	20.00	910.00		
6/7/2020 3:28:00 PM	Water	7.00	10.00	1720.00		
6/7/2020 3:31:00 PM	BJCem P100.3.02R	8.00	81.00	2054.00		
6/7/2020 3:41:00 PM	BJCem P70.6.01R	8.00	234.00	2054.00		
6/7/2020 4:26:00 PM	Displacement	10.00	152.00	3528.00		

MIN / MAX / AVG PRESSURE AND RATES

	MIN	MAX	AVG
Pressure (psi)	910.00	3528.00	1927.33
Rate (bpm)	5.00	10.00	7.50

DISPLACEMENT AND END OF JOB SUMMARY

Displaced By	BJ	Amt of Cement Returned / Reversed	0.00
Calculated Displacement Vol (bbls)	152.00	Method Used to Verify Returns	Visual
Actual Displacement Vol (bbls)	152.00	Amt of Spacer to Surface	0.00
Did Float Hold?	Yes	Pressure Left on Casing (psi)	0.00
Bump Plug	Yes	Amt Bled Back After Job	2.00
Bump Plug Pressure (psi)	3388.00	Total Volume Pumped (bbls)	517.00
Were Returns Planned at Surface	Yes	Top Out Cement Spotted	No
Cement Returns During Job	Full	Lost Circulation During Cement Job	No

BJ Cementing Event Log

Long String - Rifle, CO - Douglas Diaz

SEQ	START DATE / TIME	EVENT	DENSITY (ppg)	PUMP RATE (bpm)	PUMP VOL (bbls)	PIPE PRESSURE (psi)	COMMENTS
1	06/07/2020 09:00	Callout					Yard call 0900 on location 1200
2	06/07/2020 10:45	Depart for Location					Leave Rifle shop for location
3	06/07/2020 11:04	Arrive on Location					Arrive on location, rig running casing
4	06/07/2020 11:04	Spot Units					Spot in all equipment
5	06/07/2020 11:37	Rig Up					Pre rig up safety meeting, rig in all pump and lines to stand pipe
6	06/07/2020 12:05	Rig					Waiting on rig to finish casing and circulate
7	06/07/2020 13:25	STEACS Briefing					Pre job safety meeting with company man and rig crew
8	06/07/2020 13:40	Rig					Waiting on rig to finish circulation
9	06/07/2020 14:15	Rig					Rig ended circulation, circulated 90 mins @ 11 BBLs/min total of 990 BBLs
10	06/07/2020 14:15	Rig					Rig laying down CRT
11	06/07/2020 14:18	Rig Up					Rig in cement head and lines on the floor
12	06/07/2020 14:25	Prime Up	8.3400	7.00	10.00	1298.00	Prime up pump and lines, returns
13	06/07/2020 14:27	Pressure Test				5000.00	Pressure test
14	06/07/2020 14:34	Pump Spacer	8.3400	5.00	20.00	910.00	Pumping mud flush spacer
15	06/07/2020 14:40	Equipment Issue					Truck had leak, cut rubber on mix water jet, replaced
16	06/07/2020 15:28	Pump Spacer	8.3400	7.00	10.00	1720.00	Pumping fresh water spacer
17	06/07/2020 15:31	Pump Lead Cement	12.7000	7.00	0.00	1958.00	Pumping Lead cement
18	06/07/2020 15:31	Pump Lead Cement	12.7000	8.00	50.00	1898.00	Pumping Lead cement
19	06/07/2020 15:37	Pump Lead Cement	12.7000	8.00	81.00	2054.00	Pumping Lead cement

Client: Terra Energy Partners, LLC

Well Name / API: FEDERAL #PA 434-13 / 05-045-24205

Well MD: 9889

Quote #: QUO-45509-Q2Y1M9

Plan #: ORD-26229-N6M3K4

Execution #: EXC-26229-N6M3K402



SEQ	START DATE / TIME	EVENT	DENSITY (ppg)	PUMP RATE (bpm)	PUMP VOL (bbls)	PIPE PRESSURE (psi)	COMMENTS
20	06/07/2020 15:41	Pump Tail Cement	13.5000	8.00	0.00	2054.00	Pumping Tail cement
21	06/07/2020 15:41	Pump Tail Cement	13.5000	6.50	50.00	1059.00	Pumping Tail cement
22	06/07/2020 15:48	Pump Tail Cement	13.5000	8.00	100.00	1338.00	Pumping Tail cement
23	06/07/2020 15:54	Pump Tail Cement	13.5000	8.00	150.00	1385.00	Pumping Tail cement
24	06/07/2020 16:00	Pump Tail Cement	13.5000	7.00	200.00	1158.00	Pumping Tail cement
25	06/07/2020 16:07	Pump Tail Cement	13.5000	4.00	231.00	336.00	Pumping Tail cement
26	06/07/2020 16:14	Wash Pumps and Lines					Wash pump and lines to 3-sided tank
27	06/07/2020 16:25	Drop Top Plug					Dropped top plug, verified by company man
28	06/07/2020 16:26	Pump Displacement	8.3400	10.00	0.00	958.00	Pumping KCL displacement
29	06/07/2020 16:26	Pump Displacement	8.3400	9.50	50.00	1925.00	Pumping KCL displacement
30	06/07/2020 16:33	Pump Displacement	8.3400	10.00	100.00	2848.00	Pumping KCL displacement
31	06/07/2020 16:39	Pump Displacement	8.3400	4.00	152.00	2528.00	Pumping KCL displacement
32	06/07/2020 16:46	Land Plug				3588.00	Land plug, FCP 2528 PSI bumped to 3588 PSI
33	06/07/2020 16:46	Check Floats					Bled pressure, floats held, 2 BBLs bled back
34	06/07/2020 16:49	Rig Down					Pre rig down safety meeting, rig down cement head and lines on the rig floor
35	06/07/2020 16:55	Wash Pumps and Lines					Wash pump and lines to 3-sided tank
36	06/07/2020 17:10	Rig Down					Rig down lines and equipment
37	06/07/2020 17:20	Leave Location					Leave location for Rifle shop



Terra PA 434-13 Prod (AA CPF-011 6/7/20)

