



Terra Energy Partners

Well Name: FEDERAL PA 532-13

API #: 05-045-24204

Job Type: Production

Date Job Completed: 8/18/2020

Quote #: QUO-46142

Execution #: EXC-26409



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	Paul Linn III	FORMATION	
CLIENT FIELD REPRESENTATIVE	Garrett Wade	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	1,126.00		J-55	ST&C
Open Hole	8.75			10,005.00	45.00		
Casing	4.00	4.50	11.60	10,003.51		P-110	LT&C

HARDWARE

Bottom Plug Used?	No	Tool Type	Float Collar
Top Plug Used?	Yes	Tool Depth (ft)	9,974.32
Top Plug Provided By	Non BJ	Pipe Movement	None
Top Plug Size	4.500	Job Pumped Through	Manifold
Centralizers Used	Yes	Top Connection Thread	Buttress
Centralizers Quantity	30.00	Top Connection Size	4.5
Centralizers Type	Bow		
Landing Collar Depth (ft)	10,003		

CIRCULATION PRIOR TO JOB

Well Circulated By	Rig
Circulation Prior to Job	Yes
Circulation Time (min)	90.00
Circulation Rate (bpm)	10.00
Circulation Volume (bbls)	900.00
Lost Circulation Prior to Cement Job	No
Mud Density In (ppg)	12.00
Mud Density Out (ppg)	12.00

TEMPERATURE

Ambient Temperature (°F)	96.00	Slurry Cement Temperature (°F)	84.40
Mix Water Temperature (°F)	78.30	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			5,942.00				10.0000
Spacer	Mud Flush	8.4000			5,554.00				20.0000
Spacer	Water	8.3000			5,866.00				10.0000
Lead Slurry	BJCem P100.3.02R	12.7000	1.9801	11.09	6,124.00	1,068.00	241	476.0000	84.7000
Tail Slurry	BJCem P70.6.01R	13.5000	1.8305	9.11	7,192.00	2,951.00	721	1319.0000	234.7000
Displacement	Displacement	8.3000			0.00			0.0000	156.9000

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	FOAM PREVENTER, FP-25	0.3000	BWOB
Lead Slurry	BJCem P100.3.02R	IntegraSeal POLI	0.2500	LBS/SK
Lead Slurry	BJCem P100.3.02R	DISPERSANT, CD-31	0.1000	BWOB
Lead Slurry	BJCem P100.3.02R	CEMENT, ASTM TYPE III	100.0000	PCT
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	RETARDER, R-3	0.4000	BWOB
Tail Slurry	BJCem P70.6.01R	CEMENT, FLY ASH (POZZOLAN)	20.0000	PCT
Tail Slurry	BJCem P70.6.01R	EXTENDER, BENTONITE	6.0000	BWOB
Tail Slurry	BJCem P70.6.01R	RETARDER, R-3	0.4000	BWOB
Tail Slurry	BJCem P70.6.01R	FOAM PREVENTER, FP-25	0.3000	BWOB
Tail Slurry	BJCem P70.6.01R	IntegraSeal POLI	0.2500	LBS/SK
Tail Slurry	BJCem P70.6.01R	CEMENT, CLASS G	70.0000	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	SAND, S-8, Silica Flour, 200 Mesh	25.0000	BWOB

TIME	FLUID	RATE (bpm)	FLUID VOL (bbls)	PIPE PRESS (psi)
8/18/2020 9:20:00 PM	Water	5.00	10.00	1015.00
8/18/2020 9:25:00 PM	Mud Flush	5.00	20.00	1029.00
8/18/2020 9:27:00 PM	Water	5.00	10.00	1113.00
8/18/2020 9:28:00 PM	BJCem P100.3.02R	8.00	84.70	2384.00
8/18/2020 9:40:00 PM	BJCem P70.6.01R	8.00	234.70	2509.00
8/18/2020 10:26:00 PM	Displacement	10.00	154.60	863.00

MIN / MAX / AVG PRESSURE AND RATES

	MIN	MAX	AVG
Pressure (psi)	356.00	4033.00	1741.00
Rate (bpm)	2.00	10.00	8.00

DISPLACEMENT AND END OF JOB SUMMARY

Displaced By	BJ	Amt of Cement Returned / Reversed	0.00
Calculated Displacement Vol (bbls)	154.60	Method Used to Verify Returns	Visual
Actual Displacement Vol (bbls)	154.50	Amt of Spacer to Surface	0.00
Did Float Hold?	No	Pressure Left on Casing (psi)	4688.00
Bump Plug	Yes	Top Out Cement Spotted	No
Bump Plug Pressure (psi)	4212.00	Lost Circulation During Cement Job	No
Were Returns Planned at Surface	Yes		
Cement Returns During Job	Full		

BJ Cementing Event Log

Long String - Rifle, CO - Paul Linn III

SEQ	START DATE / TIME	EVENT	DENSITY (ppg)	PUMP RATE (bpm)	PUMP VOL (bbls)	PIPE PRESSURE (psi)	COMMENTS
1	08/18/2020 14:00	Callout					Callout on location time of 17:00 08/18/2020
2	08/18/2020 15:04	STEACS Briefing					Pre-Convoy STEACS Briefing with all BJ Services cement crew
3	08/18/2020 15:40	Depart for Location					Depart from Rifle yard for H&P 318
4	08/18/2020 16:38	Arrive on Location					Arrive on location rig was running casing
5	08/18/2020 16:45	Spot Units					Did a site assessment and spotted in all equipment
6	08/18/2020 17:00	STEACS Briefing					Pre-Rig Up STEACS Briefing with all BJ Services cement crew
7	08/18/2020 17:11	Rig Up					Rip Up all equipment
8	08/18/2020 18:02	Client					Wait on rig to finish running casing and circulate
9	08/18/2020 20:39	STEACS Briefing					Pre-Job STEACS Briefing with rig crew, company man, and all BJ Services cement crew
10	08/18/2020 20:50	Rig Up					Load plug in plug container (verified by company man), stab plug container, hook up lines
11	08/18/2020 21:13	Prime Up	8.4000	2.00	5.00	356.00	Fill lines with 5 bbls of fresh water
12	08/18/2020 21:17	Pressure Test				5513.00	Pressure test 5513 psi
13	08/18/2020 21:20	Pump Spacer	8.4000	5.00	10.00	1015.00	Pump Water Spacer
14	08/18/2020 21:25	Pump Spacer	8.5000	5.00	20.00	1029.00	Pump Mud Flush
15	08/18/2020 21:27	Pump Spacer	8.4000	5.00	10.00	1113.00	Pump Water Spacer
16	08/18/2020 21:28	Pump Lead Cement	12.7000	8.00	5.00	2384.00	Pump Lead Cement @ 12.7 ppg 241 sks 1.98 cuft/sk 11.09 gals/sk. For a total of 84.99 bbls of Lead cement requiring 63.63 bbls of mix water, weight verified with mud scale
17	08/18/2020 21:34	Pump Lead Cement	12.7000	8.00	50.00	2274.00	Pump Lead Cement

Client: Terra Energy Partners, LLC

Well Name / API: FEDERAL # PA 532-13 / 05-045-24204

Well MD: 10005

Quote #: QUO-46142-N5Z7D2

Plan #: ORD-26409-S9Z6D4

Execution #: EXC-26409-S9Z6D402



SEQ	START DATE / TIME	EVENT	DENSITY (ppg)	PUMP RATE (bpm)	PUMP VOL (bbls)	PIPE PRESSURE (psi)	COMMENTS
18	08/18/2020 21:39	Pump Lead Cement	12.7000	6.00	85.00	1597.00	Finished pumping Lead Cement with 85 bbls away
19	08/18/2020 21:40	Pump Tail Cement	13.5000	8.00	5.00	2509.00	Pump Tail Cement @ 13.5 ppg 721 sks 1.83 cuft/sk 9.11 gals/sk. For a total of 234.99 bbls of Tail cement requiring 156.39 bbls of mix water
20	08/18/2020 21:47	Pump Tail Cement	13.5000	8.00	50.00	1741.00	Pump Tail Cement
21	08/18/2020 21:53	Pump Tail Cement	13.5000	8.00	100.00	1407.00	Pump Tail Cement
22	08/18/2020 22:01	Pump Tail Cement	13.5000	8.00	150.00	1296.00	Pump Tail Cement
23	08/18/2020 22:04	Pump Tail Cement	13.5000	8.00	200.00	1369.00	Pump Tail Cement
24	08/18/2020 22:16	Pump Tail Cement	13.5000	4.00	248.00	386.00	Finished pumping Tail Cement with 248 bbls away
25	08/18/2020 22:19	Wash Pumps and Lines					Wash pump & lines to 3-sided tank
26	08/18/2020 22:24	Drop Top Plug					Drop plug, verified by company man
27	08/18/2020 22:26	Pump Displacement	8.4000	10.00	10.00	863.00	Pump KCL Water Displacement
28	08/18/2020 22:30	Pump Displacement	8.4000	10.00	50.00	2463.00	Pump KCL Water Displacement
29	08/18/2020 22:35	Pump Displacement	8.4000	10.00	100.00	3247.00	Pump KCL Water Displacement
30	08/18/2020 22:40	Pump Displacement	8.4000	10.00	144.00	4068.00	Pump KCL Water Displacement
31	08/18/2020 22:42	Pump Displacement	8.4000	4.00	154.50	3064.00	Pump KCL Water Displacement
32	08/18/2020 22:43	Land Plug				4212.00	Land the plug @ 3064 psi took to 4212 psi
33	08/18/2020 22:47	Check Floats					Check floats, floats didn't hold 3 1/2 bbls back
34	08/18/2020 22:48	Other (See comment)	8.4000	1.50	3.50	2863.00	Pump back into well
35	08/18/2020 22:52	Land Plug				4696.00	Pressure back up on well
36	08/18/2020 23:06	Check Floats					Check floats, floats didn't hold 3 bbls back
37	08/18/2020 23:06	Other (See comment)	8.4000	1.50	3.00	2996.00	Pump back into well
38	08/18/2020 23:09	Land Plug				4697.00	Pressure back up on well
39	08/18/2020 23:39	Check Floats					Check floats, floats didn't hold 4 bbls back
40	08/18/2020 23:44	Other (See comment)	8.4000	1.50	1.50	3011.00	Pump back into well
41	08/18/2020 23:48	Close Wellhead				4688.00	Pressure back up on well, and shut in well
42	08/18/2020 23:56	Wash Pumps and Lines					Wash pump & lines to 3-sided tank

SEQ	START DATE / TIME	EVENT	DENSITY (ppg)	PUMP RATE (bpm)	PUMP VOL (bbls)	PIPE PRESSURE (psi)	COMMENTS
43	08/19/2020 00:00	STEACS Briefing					Pre-Rig Down STEACS Briefing with all BJ Services cement crew
44	08/19/2020 00:08	Rig Down					Rig Down all equipment
45	08/19/2020 01:19	STEACS Briefing					Pre-Convoy STEACS Briefing with all BJ Services cement crew
46	08/19/2020 01:30	Leave Location					Depart from location for Rifle yard. Thank you for using BJ Services, Andrew Linn, and crew



Terra PA 532-13 Production

