



Terra Energy Partners

Well Name: FEDERAL #PA 32-13

API #: 05-045-24201

Job Type: Production

Date Job Completed: 7/20/2020

Quote #: QUO-46383

Execution #: EXC-26509



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@bjsservices.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	Darrell Leatherman	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)	TVD (ft)	EXCESS (%)	GRADE	THREAD
Previous Casing	8.92	9.63	36.00	1,127.00	1,043.00		J-55	ST&C
Open Hole	8.75	0.00	0.00	10,305.00	9,496.00	45.00		
Casing	4.00	4.50	11.60	10,298.00	9,496.00		P-110	LT&C

HARDWARE

Bottom Plug Used?	No	Tool Type	Float Collar
Top Plug Used?	Yes	Tool Depth (ft)	10,261.64
Top Plug Provided By	Non BJ	Pipe Movement	Reciprocation
Top Plug Size	4.500	Job Pumped Through	Manifold
Centralizers Used	Yes	Top Connection Thread	8 RND
Centralizers Quantity	30.00	Top Connection Size	4.5
Centralizers Type	Bow		
Landing Collar Depth (ft)	10,298		

CIRCULATION PRIOR TO JOB

Well Circulated By	Rig	Flare Prior to / during the Cement Job	No
Circulation Prior to Job	Yes	Gas Present	Yes
Circulation Time (min)	60.00	Gas Units	338
Circulation Rate (bpm)	10.75		
Circulation Volume (bbls)	645.00		
Lost Circulation Prior to Cement Job	No		
Mud Density In (ppg)	11.20		
Mud Density Out (ppg)	11.20		

TEMPERATURE

Ambient Temperature (°F)	98.00	Slurry Cement Temperature (°F)	89.60
Mix Water Temperature (°F)	78.60	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			6,244.00				10.0000
Lead Slurry	BJCem P100.3.02R	12.7000	1.9801	11.09	6,426.00	1,078.00	243	481.0000	85.5000
Tail Slurry	BJCem P70.6.01R	13.5000	1.8305	9.11	7,504.00	2,950.00	720	1318.0000	234.7000
Displacement	Displacement	8.3000			0.00			0.0000	161.8000

FLUID TYPE	FLUID NAME	COMPONENT	CONCENTRATION	UOM
Spacer / Pre Flush / Flush	Mud Flush	SPACER SURFACTANT, SS-201	0.5000	GPB
Spacer / Pre Flush / Flush	Mud Flush	MUD REMOVAL, SAPP	10.0000	PPB
Lead Slurry	BJCem P100.3.02R	IntegraGuard GW-86	0.1000	BWOB
Lead Slurry	BJCem P100.3.02R	RETARDER, R-3	0.4000	BWOB
Lead Slurry	BJCem P100.3.02R	FOAM PREVENTER, FP-25	0.3000	BWOB
Lead Slurry	BJCem P100.3.02R	FLUID LOSS, FL-66	0.5000	BWOB
Lead Slurry	BJCem P100.3.02R	DISPERSANT, CD-31	0.1000	BWOB
Lead Slurry	BJCem P100.3.02R	IntegraSeal POLI	0.2500	LBS/SK
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	IntegraSeal POLI	0.2500	LBS/SK
Tail Slurry	BJCem P70.6.01R	BONDING AGENT, BA-90	10.0000	PCT
Tail Slurry	BJCem P70.6.01R	CEMENT, FLY ASH (POZZOLAN)	20.0000	PCT
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	SAND, S-8, Silica Flour, 200 Mesh	25.0000	BWOB
Tail Slurry	BJCem P70.6.01R	FLUID LOSS, FL-24	0.4000	BWOB

TREATMENT SUMMARY

TIME	FLUID	RATE (bpm)	FLUID VOL (bbls)	PIPE PRESS (psi)
7/20/2020 1:46:00 PM	Water	5.00	10.00	299.00
7/20/2020 1:48:00 PM	Mud Flush	5.00	20.00	320.00
7/20/2020 1:53:00 PM	Water	5.00	10.00	396.00
7/20/2020 1:56:00 PM	BJCem P100.3.02R	8.00	85.50	1036.00
7/20/2020 2:14:00 PM	BJCem P70.6.01R	8.00	234.70	904.00
7/20/2020 3:06:00 PM	Displacement	10.00	159.06	765.00

MIN / MAX / AVG PRESSURE AND RATES

	MIN	MAX	AVG
Pressure (psi)	246.00	3615.00	774.00
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)	159.06	Method Used to Verify Returns	Visual
Actual Displacement Vol (bbls)	159.00	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	1.00
Bump Plug Pressure (psi)	2751.00	Top Out Cement Spotted	No
Were Returns Planned at Surface	Yes	Lost Circulation During Cement Job	No
Cement Returns During Job	Partial		



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	07/20/2020 00:30	Callout					Call out, On location time of 05:00 07/20/2020
2	07/20/2020 02:38	STEACS Briefing					Pre-Convoy STEACS Briefing with all BJ Services cement crew
3	07/20/2020 02:44	Depart for Location					Depart from Rifle yard for H&P 318
4	07/20/2020 03:39	Arrive on Location					Arrive on location, rig was running casing
5	07/20/2020 03:47	Spot Units					Did a site assessment and spotted in all equipment
6	07/20/2020 03:58	STEACS Briefing					Pre-Rig Up STEACS Briefing with all BJ Services cement crew
7	07/20/2020 04:09	Rig Up					Rig Up all ground equipment
8	07/20/2020 04:41	Client					Wait on rig to finish running casing and circulate
9	07/20/2020 12:55	STEACS Briefing					Pre-Job STEACS Briefing with rig crew, company man, and all BJ Services cement crew
10	07/20/2020 13:10	Rig Up					Load plug in plug container, stab plug container, and hook up lines
11	07/20/2020 13:37	Prime Up	8.4000	2.00	5.00	348.00	Fill lines with 5 bbls of fresh water
12	07/20/2020 13:41	Pressure Test				5536.00	Pressure test to 5536 psi
13	07/20/2020 13:46	Pump Spacer	8.4000	5.00	10.00	299.00	Pump Water Spacer
14	07/20/2020 13:48	Pump Spacer	8.5000	5.00	20.00	320.00	Pump Mud Flush
15	07/20/2020 13:54	Pump Spacer	8.4000	5.00	10.00	396.00	Pump Water Spacer
16	07/20/2020 13:57	Pump Lead Cement	12.7000	8.00	10.00	1036.00	Pump Lead Cement @ 12.7 ppg 243 sks 1.98 cuft/sk 11.09 gals/sk. For a total of 85.69 bbls of Lead Cement 64.16 bbls of mix water, weight verified with mud scales, and fiber added
17	07/20/2020 14:04	Pump Lead Cement	12.7000	7.00	50.00	625.00	Pump Lead Cement with fiber
18	07/20/2020 14:13	Pump Lead Cement	12.7000	8.00	135.00	774.00	Finished pumping Lead Cement with 135 bbls away

Client: Terra Energy Partners, LLC

Well Name / API: FEDERAL #PA 32-13 / 05-045-24201

Well MD: 10305

Quote #: QUO-46383-B4Y4B6

Plan #: ORD-26509-K5C0N6

Execution #: EXC-26509-K5C0N602



SEQ	START DATE / TIME	EVENT	DENSITY (ppg)	PUMP RATE (bpm)	PUMP VOL (bbls)	PIPE PRESSURE (psi)	COMMENTS
19	07/20/2020 14:14	Pump Tail Cement	13.5000	8.00	5.00	904.00	Pump Tail Cement 13.5 ppg 720 sks 1.83 cuft/sk 9.11 gals/sk. For a total of 234.66 bbls of Tail Cement requiring 156.17 bbls of mix water, weight verified with mud scale
20	07/20/2020 14:27	Pump Tail Cement	13.5000	8.00	100.00	700.00	Pump Tail Cement
21	07/20/2020 14:33	Pump Tail Cement	13.5000	8.00	150.00	762.00	Pump Tail Cement
22	07/20/2020 14:37	Pump Tail Cement	13.5000	8.00	200.00	755.00	Pump Tail Cement
23	07/20/2020 14:42	Pump Tail Cement	13.5000	8.00	250.00	746.00	Pump Tail Cement
24	07/20/2020 14:46	Pump Tail Cement	13.5000	8.00	300.00	743.00	Pump Tail Cement
25	07/20/2020 14:51	Pump Tail Cement	13.5000	8.00	350.00	677.00	Pump Tail Cement
26	07/20/2020 14:57	Pump Tail Cement	13.5000	5.00	383.00	208.00	Finished pumping Tail Cement with 383 bbls away
27	07/20/2020 14:59	Wash Pumps and Lines					Wash pumps & lines to 3-sided tank
28	07/20/2020 15:04	Drop Top Plug					Drop plug, verified by company man
29	07/20/2020 15:06	Pump Displacement	8.4000	10.00	10.00	765.00	Pump Displacement
30	07/20/2020 15:11	Pump Displacement	8.4000	10.00	50.00	2030.00	Pump Displacement
31	07/20/2020 15:17	Pump Displacement	8.4000	10.00	100.00	2744.00	Pump Displacement
32	07/20/2020 15:22	Pump Displacement	8.4000	10.00	148.00	3615.00	Pump Displacement
33	07/20/2020 15:25	Pump Displacement	8.4000	4.00	159.00	2751.00	Pump Displacement
34	07/20/2020 15:26	Land Plug				3365.00	Land plug @ 2751 psi took to 3365 psi
35	07/20/2020 15:28	Check Floats					Check floats, floats held 1 bbl back
36	07/20/2020 15:35	STEACS Briefing					Pre-Rig Down STEACS Briefing with rig crew
37	07/20/2020 15:40	Rig Down					Rig Down rig floor
38	07/20/2020 15:55	Wash Pumps and Lines					Wash pumps & lines to 3-sided tank
39	07/20/2020 16:06	STEACS Briefing					Pre-Rig Down STEACS Briefing with all BJ Services cement crew
40	07/20/2020 16:13	Rig Down					Rig Down all equipment
41	07/20/2020 16:49	STEACS Briefing					Pre-Convoy STEACS Briefing with all BJ Services cement crew
42	07/20/2020 17:00	Leave Location					Depart from location for Rifle yard. Thank you for using BJ Services, Andrew Linn, and crew



