



Terra Energy Partners

Well Name: FEDERAL PA 323-23

API #: 05-045-24304

Job Type: Production

Date Job Completed: 9/1/2020

Quote #: QUO-46961

Execution #: EXC-26755



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	Steve Bumgarner	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	1,129.58		J-55	ST&C
Open Hole	8.75			9,120.00	45.00		
Casing	4.00	4.50	11.60	9,118.47		P-110	BTC

HARDWARE

Bottom Plug Used?	No	Tool Type	Float Collar
Top Plug Used?	Yes	Tool Depth (ft)	9,083.34
Top Plug Provided By	Non BJ	Pipe Movement	Reciprocation
Top Plug Size	4.500	Job Pumped Through	Manifold
Centralizers Used	Yes	Top Connection Thread	Buttress
Centralizers Quantity	25.00	Top Connection Size	4.5
Centralizers Type	Bow		
Landing Collar Depth (ft)	9,118		

CIRCULATION PRIOR TO JOB

Well Circulated By	Rig	Solids Present at End of Circulation	Yes
Circulation Prior to Job	Yes	Flare Prior to / during the Cement Job	No
Circulation Time (min)	60.00	Gas Present	Yes
Circulation Rate (bpm)	10.75	Gas Units	181
Circulation Volume (bbls)	645.00		
Lost Circulation Prior to Cement Job	No		
Mud Density In (ppg)	13.00		
Mud Density Out (ppg)	13.00		

TEMPERATURE

Ambient Temperature (°F)	81.00	Slurry Cement Temperature (°F)	79.60
Mix Water Temperature (°F)	58.60	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			4,246.00				10.0000
Spacer	Mud Flush	8.4000			5,554.00				20.0000
Spacer	Water	8.3000			6,244.00				10.0000
Tail Slurry	Primary Cement	14.2000	1.7227	8.08	4,428.00	4,849.00	1256	2164.0000	385.3000
Displacement	Displacement	8.3000			0.00			0.0000	143.5000

FLUID TYPE	FLUID NAME	COMPONENT	CONCENTRATION	UOM
Spacer	Mud Flush	SPACER SURFACTANT, SS-201	0.5000	GPB
Spacer	Mud Flush	MUD REMOVAL, SAPP	10.0000	PPB
Tail Slurry	Primary Cement	FLUID LOSS, FL-66	0.4000	BWOB
Tail Slurry	Primary Cement	CEMENT, FLY ASH (POZZOLAN)	20.0000	PCT
Tail Slurry	Primary Cement	IntegraSeal POLI	0.2500	LBS/SK
Tail Slurry	Primary Cement	SAND, S-8, Silica Flour, 200 Mesh	27.0000	BWOB
Tail Slurry	Primary Cement	FOAM PREVENTER, FP-25	0.3000	BWOB
Tail Slurry	Primary Cement	CEMENT, CLASS G	80.0000	PCT
Tail Slurry	Primary Cement	IntegraGuard GW-86	0.1000	BWOB
Tail Slurry	Primary Cement	RETARDER, R-3	0.3000	BWOB

TREATMENT SUMMARY

TIME	FLUID	RATE (bpm)	FLUID VOL (bbls)	PIPE PRESS (psi)
9/1/2020 6:21:00 PM	Water	5.00	10.00	938.00
9/1/2020 6:23:00 PM	Mud Flush	6.00	20.00	1286.00
9/1/2020 6:25:00 PM	Water	6.00	10.00	1309.00
9/1/2020 6:27:00 PM	Primary Cement	8.00	385.30	2536.00
9/1/2020 7:36:00 PM	Displacement	10.00	140.79	2150.00

MIN / MAX / AVG PRESSURE AND RATES

	MIN	MAX	AVG
Pressure (psi)	496.00	4081.00	1766.00
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)	140.79	Method Used to Verify Returns	Visual
Actual Displacement Vol (bbls)	140.50	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	1.50
Bump Plug Pressure (psi)	3216.00	Total Volume Pumped (bbls)	568.00
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 - Paul Linn III

SEQ	START DATE / TIME	EVENT	DENSITY (ppg)	PUMP RATE (bpm)	PUMP VOL (bbls)	PIPE PRESSURE (psi)	COMMENTS
1	09/01/2020 12:00	Callout					Callout, on location time of 17:00 09/01/2020
2	09/01/2020 14:22	STEACS Briefing					Pre-Convoy STEACS Briefing with all BJ Services cement crew
3	09/01/2020 14:36	Depart for Location					Depart from Rifle yard for H&P 318
4	09/01/2020 15:22	Arrive on Location					Arrive on location, rig was running casing
5	09/01/2020 15:31	Spot Units					Did a site assessment and spotted in all equipment
6	09/01/2020 15:42	STEACS Briefing					Pre-Rig Up STEACS Briefing with all BJ Services cement crew
7	09/01/2020 15:54	Rig Up					Rig up all ground equipment
8	09/01/2020 16:42	Client					Wait on rig to finish running casing and circulate
9	09/01/2020 17:50	STEACS Briefing					Pre-Job STEACS Briefing with rig crew, company man, and all BJ Services cement crew
10	09/01/2020 18:03	Rig Up					Load plug in plug container (verified by company man), stab plug container, and hook up lines
11	09/01/2020 18:16	Prime Up	8.4000	2.00	5.00	496.00	Fill lines with 5 bbls of fresh water
12	09/01/2020 18:18	Pressure Test				5432.00	Pressure test to 5432 psi
13	09/01/2020 18:21	Pump Spacer	8.4000	5.00	10.00	938.00	Pump Water Spacer
14	09/01/2020 18:22	Pump Spacer	8.6000	6.00	20.00	1286.00	Pump Mud Flush
15	09/01/2020 18:25	Pump Spacer	8.4000	6.00	10.00	1309.00	Pump Water Spacer
16	09/01/2020 18:27	Pump Tail Cement	14.2000	8.00	5.00	2536.00	Pump Tail Cement @ 14.2 ppg 1256 sks 1.72 cuft/sk 8.08 gals/sk. For a total of 384.75 bbls of Cement requiring 241.63 bbls of mix water, weight verified with mud scale
17	09/01/2020 18:38	Pump Tail Cement	14.2000	6.00	50.00	1550.00	Pump Tail Cement
18	09/01/2020 18:45	Pump Tail Cement	14.2000	8.00	100.00	2604.00	Pump Tail Cement

Client: Terra Energy Partners, LLC

Well Name / API: FEDERAL #PA 323-23 / 05-045-24304

Well MD: 9120

Quote #: QUO-46961-Q5X1L0

Plan #: ORD-26755-G7L4L2

Execution #: EXC-26755-G7L4L202



SEQ	START DATE / TIME	EVENT	DENSITY (ppg)	PUMP RATE (bpm)	PUMP VOL (bbls)	PIPE PRESSURE (psi)	COMMENTS
19	09/01/2020 18:53	Pump Tail Cement	14.2000	8.00	150.00	1455.00	Pump Tail Cement
20	09/01/2020 18:58	Pump Tail Cement	14.2000	8.00	200.00	1518.00	Pump Tail Cement
21	09/01/2020 19:06	Pump Tail Cement	14.2000	8.00	250.00	1586.00	Pump Tail Cement
22	09/01/2020 19:11	Pump Tail Cement	14.2000	8.00	300.00	1766.00	Pump Tail Cement
23	09/01/2020 19:20	Pump Tail Cement	14.2000	6.00	350.00	1327.00	Pump Tail Cement
24	09/01/2020 19:27	Pump Tail Cement	14.2000	5.00	385.00	586.00	Finished pumping Tail Cement with 385 bbls away
25	09/01/2020 19:28	Wash Pumps and Lines					Wash pumps & lines to pit
26	09/01/2020 19:35	Drop Top Plug					Drop plug, verified by company man
27	09/01/2020 19:36	Pump Displacement	8.4000	10.00	10.00	2150.00	Pump KCL Water Displacement
28	09/01/2020 19:39	Pump Displacement	8.4000	10.00	50.00	2684.00	Pump KCL Water Displacement
29	09/01/2020 19:45	Pump Displacement	8.4000	10.00	100.00	3491.00	Pump KCL Water Displacement
30	09/01/2020 19:48	Pump Displacement	8.4000	10.00	130.00	4081.00	Pump KCL Water Displacement
31	09/01/2020 19:51	Pump Displacement	8.4000	4.00	141.00	3216.00	Pump KCL Water Displacement
32	09/01/2020 19:51	Land Plug				4418.00	Land plug @ 3216 psi took to 4418 psi
33	09/01/2020 19:55	Check Floats					Check floats, floats held 1 1/2 bbls back
34	09/01/2020 20:00	STEACS Briefing					Pre-Rig Down STEACS Briefing with rig crew
35	09/01/2020 20:06	Rig Down					Rig Down rig floor
36	09/01/2020 20:11	Wash Pumps and Lines					Wash pumps & lines to pit
37	09/01/2020 20:19	STEACS Briefing					Pre-Rig Down STEACS Briefing with all BJ Services cement crew
38	09/01/2020 20:24	Rig Down					Rig Down all equipment
39	09/01/2020 21:21	STEACS Briefing					Pre-Convoy STEACS Briefing with all BJ Services cement crew
40	09/01/2020 21:30	Leave Location					Depart from location for Rifle yard. Thank you for using BJ Services, Andrew Linn, and crew

