



# Terra Energy Partners

**Well Name: FEDERAL #PA 421-24**

**API #: 05-045-24208**

**Job Type: Production**

**Date Job Completed: 5/14/2020**

**Quote #:** QUO-45218

**Execution #:** EXC-26072



## Terra Energy Partners

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

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

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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,

Devon Hanson

Field Engineer | (701) 590-5946 | [devon.hanson@bjservices.com](mailto:devon.hanson@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

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# BJ Cementing Treatment Report

SERVICE SUPERVISOR	Jeff Hernandez	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)	TVD (ft)	EXCESS (%)	GRADE	THREAD
Previous Casing	8.92	9.63	36.00	1,125.00	1,059.00		J-55	ST&C
Casing	4.00	4.50	11.60	10,001.00	9,441.00		P-110	LT&C
Open Hole	8.75	0.00	0.00	10,010.00	9,441.00	45.00		

## HARDWARE

Bottom Plug Used?	No	Tool Type	Float Collar
Top Plug Used?	Yes	Tool Depth (ft)	10,003.00
Top Plug Provided By	Non BJ	Max Casing Pressure - Rated (psi)	12460.00
Top Plug Size	4.500	Max Casing Pressure - Operated (psi)	10280.00
Centralizers Used	No	Pipe Movement	Reciprocation
Landing Collar Depth (ft)	10,048	Job Pumped Through	Manifold
Top Connection Size	4.5	Top Connection Thread	8rd

## CIRCULATION PRIOR TO JOB

Well Circulated By	Rig	YP Mud In	19
Circulation Prior to Job	No	Solids Present at End of Circulation	No
Circulation Time (min)	60.00	10 sec SGS	6
Circulation Rate (bpm)	10.00	10 min SGS	14
Circulation Volume (bbls)	600.00	30 min SGS	29
Lost Circulation Prior to Cement Job	No	Flare Prior to / during the Cement Job	No
PV Mud In	23	Gas Present	No

## TEMPERATURE

Ambient Temperature (°F)	65.00	Slurry Cement Temperature (°F)	70.00
Mix Water Temperature (°F)	65.00		

## FLUID DETAILS

FLUID TYPE	FLUID NAME	DENSITY (ppg)	YIELD (Cu Ft/sk)	H <sub>2</sub> O REQ (gals/sk)	PLN TOP FLD (ft)	LENGTH (ft)	VOL (sk)	VOL (Cu Ft)	VOL (bbls)
Spacer / Pre Flush / Flush	Water	8.30			0.00				10.00
Spacer / Pre Flush / Flush	Mud Flush	8.40			5,791.00				20.00
Spacer / Pre Flush / Flush	Water	8.30			0.00				10.00
Top-Out / Scavenger Slurry	Scavenger Slurry	11.00	3.3057	20.96		0.00	86	281.00	50.00
Lead Slurry	BJCem P100.3.02R	12.70	1.9801	11.09	6,074.00	1,068.00	241	476.00	84.70
Tail Slurry	BJCem P70.6.01R	13.50	1.8305	9.11	7,142.00	1,782.00	434	794.00	141.30
Tail Slurry	Tail Cement	14.20	1.7227	8.08	8,924.00	1,168.00	305	524.00	93.30
Displacement Final	Displacement	8.30			0.00			0.00	156.10

FLUID TYPE	FLUID NAME	COMPONENT	CONCENTRATION	UOM
Spacer / Pre Flush / Flush	Mud Flush	MUD REMOVAL, SAPP	10.0000	PPB
Spacer / Pre Flush / Flush	Mud Flush	SPACER SURFACTANT, SS-201	0.5000	GPB
Top-Out / Scavenger Slurry	Scavenger Slurry	FOAM PREVENTER, FP-25	0.3000	BWOB
Top-Out / Scavenger Slurry	Scavenger Slurry	RETARDER, R-3	0.1000	BWOB
Top-Out / Scavenger Slurry	Scavenger Slurry	FLUID LOSS, FL-66	0.7000	BWOB
Top-Out / Scavenger Slurry	Scavenger Slurry	CEMENT, ASTM TYPE III	100.0000	PCT
Top-Out / Scavenger Slurry	Scavenger Slurry	Cement Additive, Sodium Metasilicate A-2	0.3000	BWOB
Top-Out / Scavenger Slurry	Scavenger Slurry	CEMENT EXTENDER, GYPSUM, A-10	2.0000	BWOB
Lead Slurry	BJCem P100.3.02R	IntegraGuard GW-86	0.1000	BWOB
Lead Slurry	BJCem P100.3.02R	DISPERSANT, CD-31	0.1000	BWOB
Lead Slurry	BJCem P100.3.02R	FLUID LOSS, FL-66	0.5000	BWOB
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	CEMENT, ASTM TYPE III	100.0000	PCT
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

Client: Terra Energy Partners, LLC

Well: FEDERAL #PA 421-24

Well API: 05-045-24208

Start Date: 5/14/2020

End Date: 5/14/2020

Field Ticket #: FT-26072-N7H0P70202-49923



FLUID TYPE	FLUID NAME	COMPONENT	CONCENTRATION	UOM
Tail Slurry	BJCem P70.6.01R	BONDING AGENT, BA-90	10.0000	PCT
Tail Slurry	BJCem P70.6.01R	CEMENT, CLASS G	70.0000	PCT
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	RETARDER, R-3	0.4000	BWOB
Tail Slurry	BJCem P70.6.01R	IntegraSeal POLI	0.2500	LBS/SK
Tail Slurry	BJCem P70.6.01R	FLUID LOSS, FL-24	0.4000	BWOB
Tail Slurry	Tail Cement	CEMENT, CLASS G	80.0000	PCT
Tail Slurry	Tail Cement	CEMENT, FLY ASH (POZZOLAN)	20.0000	PCT
Tail Slurry	Tail Cement	IntegraGuard GW-86	0.1000	BWOB
Tail Slurry	Tail Cement	RETARDER, R-3	0.3000	BWOB
Tail Slurry	Tail Cement	IntegraSeal POLI	0.2500	LBS/SK
Tail Slurry	Tail Cement	FLUID LOSS, FL-66	0.4000	BWOB
Tail Slurry	Tail Cement	SAND, S-8, Silica Flour, 200 Mesh	27.0000	BWOB
Tail Slurry	Tail Cement	FOAM PREVENTER, FP-25	0.3000	BWOB

#### TREATMENT SUMMARY

TIME	FLUID	RATE (bpm)	FLUID VOL (bbls)	PIPE PRESS (psi)
5/14/2020 5:10:00 PM	Water	5.00	10.00	875.00
5/14/2020 5:18:00 PM	Mud Flush	5.00	20.00	939.00
5/14/2020 5:22:00 PM	Water	5.00	10.00	1039.00
5/14/2020 5:24:00 PM	Scavenger Slurry	5.00	50.00	1202.00
5/14/2020 5:35:00 PM	BJCem P100.3.02R	5.00	84.70	909.00
5/14/2020 6:24:00 PM	BJCem P70.6.01R	5.00	141.30	640.00
5/14/2020 6:35:00 PM	Tail Cement	5.00	93.30	620.00
5/14/2020 7:05:00 PM	Displacement	5.00	156.10	2850.00

#### MIN / MAX / AVG PRESSURE AND RATES

	MIN	MAX	AVG
Pressure (psi)	620.00	2850.00	1134.25
Rate (bpm)	5.00	5.00	5.00

## DISPLACEMENT AND END OF JOB SUMMARY

Displaced By	BJ	Amt of Cement Returned / Reversed	0.00
Calculated Displacement Vol (bbls)	155.00	Method Used to Verify Returns	Visual
Actual Displacement Vol (bbls)	155.00	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)	3500.00	Total Volume Pumped (bbls)	517.00
Were Returned Planned at Surface	No	Top Out Cement Spotted	No
Lost Circulation During Cement Job	No		

# BJ Cementing Event Log

Long String - Rifle, CO - Jeff Hernandez

SEQ	START DATE / TIME	EVENT	DENSITY (ppg)	PUMP RATE (bpm)	PUMP VOL (bbls)	PIPE PRESSURE (psi)	COMMENTS
1	05/14/2020 10:00	Callout					Call out for Terra Job on location @ 1400
2	05/14/2020 11:00	Depart for Location					Leave Rifle yard for location
3	05/14/2020 12:00	Arrive on Location					Arrive on location rig still running casing
4	05/14/2020 13:00	Spot Units					Spotted all truck for the job
5	05/14/2020 13:15	Rig Up					Held a rig up meeting then rig up location
6	05/14/2020 14:30	Rig					Waiting on rig to run casing
7	05/14/2020 16:45	STEACS Briefing					Held a safety meeting with rig crew then BJ
8	05/14/2020 17:00	Rig Up					Rig up the head to run the job
9	05/14/2020 17:10	Pump Spacer	8.3400	5.00	10.00	845.00	Pump spacer water
10	05/14/2020 17:15	Pressure Test				5000.00	Test line to 5000 psi
11	05/14/2020 17:18	Pump Spacer	8.3400	5.00	20.00	945.00	Pump 20 bbl of mud flush
12	05/14/2020 17:22	Pump Spacer	8.3400	5.00	10.00	1039.00	Pump 10 bbl of water
13	05/14/2020 17:24	Pumping Cement	11.0000	5.00	50.00	1202.00	Pump scav Cement
14	05/14/2020 17:34	Pump Lead Cement	12.7000	5.00	84.00	909.00	Pump Lead Cement
15	05/14/2020 18:00	Pump Tail Cement	13.5000	5.00	50.00	742.00	Pump Tail Cement
16	05/14/2020 18:14	Pump Tail Cement	13.5000	5.00	10.00	662.00	Pump Tail Cement
17	05/14/2020 18:24	Pump Tail Cement	13.5000	5.00	141.00	620.00	Pump Tail Cement
18	05/14/2020 18:35	Pump Tail Cement	14.2000	5.00	50.00	650.00	Pump Tail Cement
19	05/14/2020 18:41	Pump Tail Cement	14.2000	5.00	94.00	632.00	Pump Tail Cement

Client: Terra Energy Partners, LLC

Well Name / API: FEDERAL #PA 421-24 / 05-045-24208

Well MD: 10092

Quote #: QUO-45218-D1T8Q2

Plan #: ORD-26072-N7H0P7

Execution #: EXC-26072-N7H0P702



SEQ	START DATE / TIME	EVENT	DENSITY (ppg)	PUMP RATE (bpm)	PUMP VOL (bbls)	PIPE PRESSURE (psi)	COMMENTS
20	05/14/2020 18:55	Wash Pumps and Lines					Wash pumps and line's
21	05/14/2020 19:05	Drop Top Plug					Drop top plug
22	05/14/2020 19:06	Pump Displacement	8.3400	7.00	550.00	676.00	Pump displacement
23	05/14/2020 19:13	Pump Displacement	8.3400	7.00	100.00	1800.00	Pump Displacement
24	05/14/2020 19:22	Pump Displacement	8.3400	7.00	140.00	2850.00	Pump Displacement
25	05/14/2020 19:30	Land Plug	8.3400	2.00	155.00	3500.00	Bump plug from 2850 to 3500 psi
26	05/14/2020 19:32	Check Floats					Check float bled back 1 bbl
27	05/14/2020 19:37	Rig Down					Held a rig down meeting then rig down iron
28	05/14/2020 20:45	Leave Location					Leave location for yard



