



Laramie Energy, LLC

Mesa County, CO

Bruton 30-10 Pad

Bruton Federal 30-20W

A-2

Design: A-2

QES Survey Report

30 January, 2018





Survey Report



Company:	Laramie Energy, LLC	Local Co-ordinate Reference:	Well Bruton Federal 30-20W
Project:	Mesa County, CO	TVD Reference:	well @ 7673.0usft (H&P #522)
Site:	Bruton 30-10 Pad	MD Reference:	well @ 7673.0usft (H&P #522)
Well:	Bruton Federal 30-20W	North Reference:	True
Wellbore:	A-2	Survey Calculation Method:	Minimum Curvature
Design:	A-2	Database:	EDM 5000.1 Single User Db

Project	Mesa County, CO		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	Colorado Central Zone		

Site		Bruton 30-10 Pad						
Site Position:		Northing:	1,523,424.58	usft	Latitude:	39.247725		
From:	Map	Easting:	2,346,291.81	usft	Longitude:	-107.808574		
Position Uncertainty:	0.0	usft	Slot Radius:	13-3/16	"	Grid Convergence:	-1.46	°

Well	Bruton Federal 30-20W					
Well Position	+N/-S	0.0 usft	Northing:	1,523,539.72 usft	Latitude:	39.248036
	+E/-W	0.0 usft	Easting:	2,346,221.85 usft	Longitude:	-107.808831
Position Uncertainty		0.0 usft	Wellhead Elevation:	0.0 usft	Ground Level:	7,643.0 usft

Wellbore	A-2				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	1/25/2018	9.52	65.41	51,338.20730757

Design	A-2				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)	
	0.0	0.0	0.0	217.73	

Survey Program	Date	1/30/2018			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
111.0	8,344.0	QES MWD Surveys (A-2)	MWD default	MWD - Standard	

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00
First MWD Survey @ 111.0' MD / 111.0' TVD									
111.0	1.10	207.70	111.0	-0.9	-0.5	1.0	0.99	0.99	0.00
202.0	3.10	208.60	201.9	-3.9	-2.1	4.3	2.20	2.20	0.99
293.0	3.90	203.90	292.8	-8.9	-4.5	9.8	0.93	0.88	-5.16
384.0	5.90	219.40	383.4	-15.3	-8.7	17.5	2.62	2.20	17.03
475.0	10.30	221.40	473.5	-25.0	-17.1	30.3	4.84	4.84	2.20
567.0	12.30	219.50	563.7	-38.8	-28.8	48.3	2.21	2.17	-2.07
658.0	15.40	219.30	652.0	-55.6	-42.6	70.0	3.41	3.41	-0.22
749.0	18.20	217.50	739.2	-76.2	-58.9	96.3	3.13	3.08	-1.98
840.0	20.60	215.10	825.0	-100.6	-76.7	126.5	2.78	2.64	-2.64



Survey Report



Company:	Laramie Energy, LLC	Local Co-ordinate Reference:	Well Bruton Federal 30-20W
Project:	Mesa County, CO	TVD Reference:	well @ 7673.0usft (H&P #522)
Site:	Bruton 30-10 Pad	MD Reference:	well @ 7673.0usft (H&P #522)
Well:	Bruton Federal 30-20W	North Reference:	True
Wellbore:	A-2	Survey Calculation Method:	Minimum Curvature
Design:	A-2	Database:	EDM 5000.1 Single User Db

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
934.0	24.00	216.30	911.9	-129.5	-97.6	162.2	3.65	3.62	1.28
1,028.0	26.90	219.10	996.8	-161.5	-122.3	202.6	3.34	3.09	2.98
1,123.0	30.20	217.80	1,080.3	-197.0	-150.5	247.9	3.53	3.47	-1.37
1,217.0	31.00	219.00	1,161.2	-234.5	-180.2	295.8	1.07	0.85	1.28
1,311.0	31.60	217.90	1,241.5	-272.8	-210.6	344.6	0.88	0.64	-1.17
1,405.0	33.40	217.80	1,320.8	-312.7	-241.6	395.1	1.92	1.91	-0.11
1,499.0	33.70	218.80	1,399.1	-353.4	-273.8	447.1	0.67	0.32	1.06
1,606.0	33.70	218.00	1,488.1	-399.9	-310.7	506.4	0.41	0.00	-0.75
1,701.0	33.10	217.70	1,567.4	-441.2	-342.8	558.7	0.66	-0.63	-0.32
1,795.0	33.20	217.60	1,646.1	-481.9	-374.2	610.1	0.12	0.11	-0.11
1,889.0	32.50	216.40	1,725.1	-522.7	-404.8	661.1	1.02	-0.74	-1.28
1,983.0	32.10	216.30	1,804.6	-563.1	-434.6	711.3	0.43	-0.43	-0.11
2,078.0	32.70	217.00	1,884.8	-603.9	-465.0	762.2	0.74	0.63	0.74
2,172.0	33.90	218.40	1,963.3	-644.8	-496.6	813.8	1.52	1.28	1.49
2,266.0	33.20	219.10	2,041.7	-685.3	-529.1	865.8	0.85	-0.74	0.74
2,360.0	32.40	218.50	2,120.7	-725.0	-561.0	916.7	0.92	-0.85	-0.64
2,454.0	33.40	220.60	2,199.6	-764.3	-593.5	967.7	1.61	1.06	2.23
2,548.0	32.70	220.10	2,278.4	-803.4	-626.7	1,018.9	0.80	-0.74	-0.53
2,642.0	34.40	219.10	2,356.7	-843.4	-659.8	1,070.8	1.90	1.81	-1.06
2,737.0	34.00	219.80	2,435.3	-884.7	-693.7	1,124.2	0.59	-0.42	0.74
2,831.0	33.80	217.40	2,513.3	-925.6	-726.4	1,176.6	1.44	-0.21	-2.55
2,925.0	32.70	217.50	2,591.9	-966.5	-757.8	1,228.2	1.17	-1.17	0.11
3,019.0	34.10	217.50	2,670.4	-1,007.6	-789.3	1,279.9	1.49	1.49	0.00
3,114.0	33.20	217.00	2,749.5	-1,049.5	-821.1	1,332.5	0.99	-0.95	-0.53
3,208.0	32.40	215.70	2,828.5	-1,090.5	-851.3	1,383.4	1.13	-0.85	-1.38
3,302.0	33.50	218.70	2,907.4	-1,131.2	-882.2	1,434.5	2.09	1.17	3.19
3,396.0	33.20	218.60	2,985.9	-1,171.6	-914.5	1,486.2	0.32	-0.32	-0.11
3,490.0	32.80	218.40	3,064.8	-1,211.6	-946.4	1,537.4	0.44	-0.43	-0.21
3,584.0	32.30	219.10	3,144.0	-1,251.1	-978.0	1,588.0	0.67	-0.53	0.74
3,679.0	31.20	219.90	3,224.8	-1,289.6	-1,009.8	1,637.9	1.24	-1.16	0.84
3,773.0	32.30	220.60	3,304.7	-1,327.4	-1,041.8	1,687.4	1.23	1.17	0.74
3,867.0	31.00	220.80	3,384.7	-1,364.8	-1,074.0	1,736.6	1.39	-1.38	0.21
3,961.0	32.70	219.80	3,464.6	-1,402.6	-1,106.0	1,786.2	1.89	1.81	-1.06
4,055.0	33.00	219.00	3,543.5	-1,442.0	-1,138.4	1,837.1	0.56	0.32	-0.85
4,150.0	32.60	219.10	3,623.4	-1,482.0	-1,170.8	1,888.6	0.42	-0.42	0.11
4,244.0	33.10	217.70	3,702.4	-1,521.9	-1,202.5	1,939.6	0.97	0.53	-1.49
4,338.0	32.30	218.70	3,781.5	-1,561.9	-1,233.9	1,990.3	1.03	-0.85	1.06
4,432.0	34.20	218.00	3,860.1	-1,602.3	-1,265.9	2,041.9	2.06	2.02	-0.74
4,526.0	33.70	217.80	3,938.0	-1,643.7	-1,298.1	2,094.4	0.55	-0.53	-0.21
4,620.0	32.90	216.50	4,016.6	-1,684.8	-1,329.3	2,146.0	1.14	-0.85	-1.38
4,715.0	32.60	217.50	4,096.5	-1,725.9	-1,360.2	2,197.4	0.65	-0.32	1.05
4,809.0	31.80	217.60	4,176.0	-1,765.6	-1,390.7	2,247.4	0.85	-0.85	0.11
4,903.0	31.20	216.60	4,256.2	-1,804.8	-1,420.4	2,296.6	0.85	-0.64	-1.06



Survey Report



Company:	Laramie Energy, LLC	Local Co-ordinate Reference:	Well Bruton Federal 30-20W
Project:	Mesa County, CO	TVD Reference:	well @ 7673.0usft (H&P #522)
Site:	Bruton 30-10 Pad	MD Reference:	well @ 7673.0usft (H&P #522)
Well:	Bruton Federal 30-20W	North Reference:	True
Wellbore:	A-2	Survey Calculation Method:	Minimum Curvature
Design:	A-2	Database:	EDM 5000.1 Single User Db

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
4,997.0	30.20	216.30	4,337.0	-1,843.4	-1,448.9	2,344.5	1.08	-1.06	-0.32	
5,092.0	29.20	215.80	4,419.5	-1,881.4	-1,476.6	2,391.6	1.08	-1.05	-0.53	
5,186.0	27.70	218.90	4,502.2	-1,917.0	-1,503.7	2,436.3	2.24	-1.60	3.30	
5,280.0	26.10	215.60	4,586.0	-1,950.8	-1,529.5	2,478.9	2.33	-1.70	-3.51	
5,374.0	25.30	214.80	4,670.7	-1,984.1	-1,553.0	2,519.6	0.93	-0.85	-0.85	
5,469.0	24.20	215.30	4,757.0	-2,016.7	-1,575.8	2,559.3	1.18	-1.16	0.53	
5,563.0	20.90	215.10	4,843.8	-2,046.1	-1,596.6	2,595.3	3.51	-3.51	-0.21	
5,657.0	19.70	216.70	4,932.0	-2,072.6	-1,615.7	2,627.9	1.41	-1.28	1.70	
5,751.0	17.60	218.80	5,021.0	-2,096.4	-1,634.1	2,658.0	2.35	-2.23	2.23	
5,845.0	15.40	221.00	5,111.1	-2,116.8	-1,651.2	2,684.6	2.43	-2.34	2.34	
5,940.0	13.50	218.60	5,203.1	-2,135.0	-1,666.4	2,708.3	2.10	-2.00	-2.53	
6,034.0	10.90	215.10	5,295.0	-2,150.9	-1,678.3	2,728.2	2.87	-2.77	-3.72	
6,128.0	8.30	222.20	5,387.7	-2,163.2	-1,688.0	2,743.8	3.03	-2.77	7.55	
6,223.0	4.90	230.10	5,482.0	-2,170.9	-1,695.7	2,754.6	3.70	-3.58	8.32	
6,317.0	3.90	212.90	5,575.8	-2,176.1	-1,700.5	2,761.7	1.75	-1.06	-18.30	
6,411.0	1.70	145.90	5,669.7	-2,180.0	-1,701.5	2,765.4	3.82	-2.34	-71.28	
6,505.0	1.60	80.30	5,763.6	-2,180.9	-1,699.4	2,764.8	1.90	-0.11	-69.79	
6,599.0	1.20	85.20	5,857.6	-2,180.6	-1,697.1	2,763.2	0.44	-0.43	5.21	
6,693.0	1.60	77.60	5,951.6	-2,180.2	-1,694.9	2,761.5	0.47	0.43	-8.09	
6,788.0	1.20	95.50	6,046.5	-2,180.0	-1,692.6	2,760.0	0.62	-0.42	18.84	
6,883.0	0.80	133.00	6,141.5	-2,180.6	-1,691.1	2,759.5	0.79	-0.42	39.47	
6,977.0	0.50	131.10	6,235.5	-2,181.3	-1,690.3	2,759.6	0.32	-0.32	-2.02	
7,071.0	1.00	159.00	6,329.5	-2,182.3	-1,689.7	2,760.0	0.64	0.53	29.68	
7,165.0	1.10	182.10	6,423.5	-2,184.0	-1,689.5	2,761.2	0.46	0.11	24.57	
7,260.0	1.20	171.60	6,518.5	-2,185.9	-1,689.3	2,762.6	0.25	0.11	-11.05	
7,354.0	1.00	190.30	6,612.5	-2,187.7	-1,689.3	2,764.0	0.43	-0.21	19.89	
7,448.0	1.00	196.60	6,706.5	-2,189.3	-1,689.7	2,765.5	0.12	0.00	6.70	
7,542.0	1.00	193.10	6,800.4	-2,190.9	-1,690.1	2,767.0	0.06	0.00	-3.72	
7,636.0	0.80	216.20	6,894.4	-2,192.2	-1,690.7	2,768.4	0.44	-0.21	24.57	
7,730.0	1.20	207.20	6,988.4	-2,193.6	-1,691.6	2,770.1	0.46	0.43	-9.57	
7,825.0	1.40	228.00	7,083.4	-2,195.3	-1,692.9	2,772.2	0.54	0.21	21.89	
7,919.0	1.60	232.30	7,177.4	-2,196.8	-1,694.8	2,774.6	0.24	0.21	4.57	
8,013.0	1.80	221.50	7,271.3	-2,198.7	-1,696.8	2,777.3	0.40	0.21	-11.49	
8,108.0	1.90	219.20	7,366.3	-2,201.1	-1,698.8	2,780.4	0.13	0.11	-2.42	
8,202.0	1.80	224.90	7,460.2	-2,203.3	-1,700.8	2,783.4	0.22	-0.11	6.06	
8,284.0	2.20	235.80	7,542.2	-2,205.1	-1,703.0	2,786.2	0.67	0.49	13.29	
Projection to TD @ 8344.0' MD / 7602.1' TVD										
8,344.0	2.20	235.80	7,602.1	-2,206.4	-1,704.9	2,788.4	0.00	0.00	0.00	



Survey Report



Company:	Laramie Energy, LLC	Local Co-ordinate Reference:	Well Bruton Federal 30-20W
Project:	Mesa County, CO	TVD Reference:	well @ 7673.0usft (H&P #522)
Site:	Bruton 30-10 Pad	MD Reference:	well @ 7673.0usft (H&P #522)
Well:	Bruton Federal 30-20W	North Reference:	True
Wellbore:	A-2	Survey Calculation Method:	Minimum Curvature
Design:	A-2	Database:	EDM 5000.1 Single User Db

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
111.0	111.0	-0.9	-0.5	First MWD Survey @ 111.0' MD / 111.0' TVD
8,344.0	7,602.1	-2,206.4	-1,704.9	Projection to TD @ 8344.0' MD / 7602.1' TVD