



Laramie Energy, LLC

Mesa County, CO

Bruton 30-10 Pad

Bruton 30-19E

B-4

Design: B-4

QES Survey Report

19 January, 2018





Survey Report



Company:	Laramie Energy, LLC	Local Co-ordinate Reference:	Well Bruton 30-19E
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 30-19E	North Reference:	True
Wellbore:	B-4	Survey Calculation Method:	Minimum Curvature
Design:	B-4	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 30-19E					
Well Position	+N/-S	0.0 usft	Northing:	1,523,561.97 usft	Latitude:	39.248097
	+E/-W	0.0 usft	Easting:	2,346,221.00 usft	Longitude:	-107.808836
Position Uncertainty		0.0 usft	Wellhead Elevation:	0.0 usft	Ground Level:	7,643.0 usft

Wellbore	B-4				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	1/6/2018	9.53	65.41	51,344.02064421

Design	B-4				
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	161.30	

Survey Program	Date	1/19/2018			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
111.0	8,214.0	QES MWD Surveys (B-4)	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	0.50	93.30	111.0	0.0	0.5	0.2	0.45	0.45	0.00
202.0	0.30	79.50	202.0	0.0	1.1	0.4	0.24	-0.22	-15.16
293.0	0.30	338.60	293.0	0.3	1.3	0.2	0.51	0.00	-110.88
384.0	1.20	311.90	384.0	1.1	0.5	-0.9	1.03	0.99	-29.34
475.0	1.10	291.10	475.0	2.1	-1.1	-2.3	0.47	-0.11	-22.86
567.0	2.00	265.60	566.9	2.3	-3.5	-3.3	1.21	0.98	-27.72
658.0	2.00	261.30	657.9	1.9	-6.6	-3.9	0.16	0.00	-4.73
749.0	0.60	213.70	748.9	1.3	-8.5	-3.9	1.82	-1.54	-52.31
840.0	1.20	176.50	839.8	-0.1	-8.7	-2.7	0.89	0.66	-40.88



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Design:	B-4	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)
931.0	1.40	142.20	930.8	-1.9	-7.9	-0.7	0.87	0.22	-37.69
1,025.0	4.20	158.20	1,024.7	-6.0	-6.0	3.8	3.06	2.98	17.02
1,119.0	7.10	161.90	1,118.2	-14.7	-2.9	13.0	3.11	3.09	3.94
1,213.0	9.20	162.20	1,211.3	-27.4	1.2	26.4	2.23	2.23	0.32
1,308.0	12.20	159.60	1,304.6	-44.1	7.1	44.0	3.20	3.16	-2.74
1,402.0	15.10	154.50	1,396.0	-64.4	15.8	66.1	3.34	3.09	-5.43
1,490.0	17.70	154.60	1,480.4	-86.9	26.5	90.8	2.95	2.95	0.11
1,609.0	18.10	156.60	1,593.6	-120.2	41.6	127.1	0.62	0.34	1.68
1,703.0	20.00	155.40	1,682.5	-148.2	54.1	157.7	2.06	2.02	-1.28
1,797.0	21.40	157.80	1,770.4	-178.7	67.2	190.8	1.74	1.49	2.55
1,891.0	23.20	158.60	1,857.4	-211.8	80.5	226.4	1.94	1.91	0.85
1,985.0	25.90	159.00	1,942.9	-248.2	94.6	265.4	2.88	2.87	0.43
2,080.0	28.70	160.60	2,027.3	-289.1	109.6	309.0	3.05	2.95	1.68
2,174.0	31.30	161.30	2,108.7	-333.5	124.9	356.0	2.79	2.77	0.74
2,268.0	32.90	159.90	2,188.3	-380.6	141.5	405.9	1.88	1.70	-1.49
2,362.0	32.10	158.90	2,267.6	-427.9	159.3	456.4	1.03	-0.85	-1.06
2,456.0	30.70	159.30	2,347.8	-473.7	176.8	505.3	1.51	-1.49	0.43
2,551.0	31.90	159.20	2,429.0	-519.8	194.3	554.7	1.26	1.26	-0.11
2,645.0	32.50	158.80	2,508.5	-566.6	212.2	604.7	0.68	0.64	-0.43
2,739.0	30.60	158.30	2,588.6	-612.4	230.2	653.8	2.04	-2.02	-0.53
2,833.0	30.50	160.90	2,669.6	-657.1	246.8	701.6	1.41	-0.11	2.77
2,927.0	30.00	162.80	2,750.8	-702.1	261.6	748.9	1.15	-0.53	2.02
3,022.0	31.50	162.80	2,832.4	-748.5	276.0	797.5	1.58	1.58	0.00
3,116.0	31.10	162.10	2,912.7	-795.1	290.7	846.3	0.58	-0.43	-0.74
3,210.0	32.00	161.80	2,992.8	-841.8	305.9	895.5	0.97	0.96	-0.32
3,304.0	31.90	161.10	3,072.6	-889.0	321.7	945.2	0.41	-0.11	-0.74
3,398.0	31.20	161.80	3,152.7	-935.6	337.4	994.4	0.84	-0.74	0.74
3,493.0	30.50	161.70	3,234.3	-981.9	352.6	1,043.1	0.74	-0.74	-0.11
3,587.0	31.20	161.10	3,315.0	-1,027.6	368.0	1,091.3	0.81	0.74	-0.64
3,681.0	30.80	160.80	3,395.5	-1,073.3	383.8	1,139.7	0.46	-0.43	-0.32
3,775.0	31.30	161.10	3,476.1	-1,119.2	399.7	1,188.2	0.56	0.53	0.32
3,869.0	31.20	161.10	3,556.4	-1,165.3	415.4	1,237.0	0.11	-0.11	0.00
3,963.0	31.40	159.90	3,636.7	-1,211.3	431.7	1,285.8	0.70	0.21	-1.28
4,057.0	30.80	159.40	3,717.2	-1,256.9	448.6	1,334.3	0.69	-0.64	-0.53
4,151.0	30.20	159.70	3,798.2	-1,301.6	465.3	1,382.0	0.66	-0.64	0.32
4,245.0	29.50	159.50	3,879.8	-1,345.4	481.6	1,428.8	0.75	-0.74	-0.21
4,340.0	29.30	160.30	3,962.5	-1,389.2	497.6	1,475.4	0.46	-0.21	0.84
4,434.0	30.20	158.70	4,044.1	-1,432.9	514.0	1,522.0	1.28	0.96	-1.70
4,529.0	29.50	159.80	4,126.5	-1,477.1	530.7	1,569.3	0.94	-0.74	1.16
4,623.0	29.10	158.70	4,208.5	-1,520.1	547.0	1,615.3	0.71	-0.43	-1.17
4,717.0	30.60	158.50	4,290.0	-1,563.7	564.1	1,662.0	1.60	1.60	-0.21
4,812.0	30.20	158.20	4,372.0	-1,608.4	581.8	1,710.0	0.45	-0.42	-0.32
4,906.0	28.70	158.40	4,453.8	-1,651.3	598.9	1,756.2	1.60	-1.60	0.21



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Survey										
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5,000.0	27.60	159.30	4,536.7	-1,692.7	614.9	1,800.5	1.25	-1.17	0.96	
5,094.0	26.50	157.90	4,620.4	-1,732.5	630.5	1,843.2	1.35	-1.17	-1.49	
5,188.0	25.20	158.30	4,705.0	-1,770.5	645.8	1,884.1	1.40	-1.38	0.43	
5,282.0	22.90	158.90	4,790.8	-1,806.1	659.8	1,922.3	2.46	-2.45	0.64	
5,377.0	21.00	161.10	4,879.0	-1,839.5	672.0	1,957.8	2.18	-2.00	2.32	
5,471.0	18.30	161.00	4,967.5	-1,869.4	682.2	1,989.4	2.87	-2.87	-0.11	
5,565.0	15.60	162.30	5,057.4	-1,895.4	690.9	2,016.8	2.90	-2.87	1.38	
5,660.0	14.10	163.70	5,149.2	-1,918.7	698.0	2,041.2	1.62	-1.58	1.47	
5,754.0	13.00	163.20	5,240.6	-1,939.8	704.3	2,063.2	1.18	-1.17	-0.53	
5,848.0	11.00	164.80	5,332.5	-1,958.6	709.7	2,082.7	2.16	-2.13	1.70	
5,942.0	8.70	173.40	5,425.1	-1,974.3	712.9	2,098.6	2.90	-2.45	9.15	
6,036.0	5.20	178.30	5,518.4	-1,985.6	713.8	2,109.6	3.77	-3.72	5.21	
6,131.0	2.10	198.60	5,613.2	-1,991.6	713.4	2,115.1	3.49	-3.26	21.37	
6,226.0	0.40	222.20	5,708.2	-1,993.5	712.6	2,116.7	1.83	-1.79	24.84	
6,320.0	0.80	183.20	5,802.2	-1,994.3	712.3	2,117.5	0.59	0.43	-41.49	
6,414.0	1.50	202.50	5,896.2	-1,996.1	711.8	2,119.0	0.84	0.74	20.53	
6,508.0	1.80	215.00	5,990.2	-1,998.5	710.5	2,120.8	0.50	0.32	13.30	
6,603.0	1.50	241.00	6,085.1	-2,000.3	708.6	2,121.9	0.84	-0.32	27.37	
6,697.0	2.20	223.00	6,179.1	-2,002.2	706.3	2,123.0	0.96	0.74	-19.15	
6,791.0	1.10	202.00	6,273.0	-2,004.4	704.7	2,124.5	1.32	-1.17	-22.34	
6,885.0	0.90	195.30	6,367.0	-2,005.9	704.2	2,125.8	0.25	-0.21	-7.13	
6,979.0	1.70	219.50	6,461.0	-2,007.7	703.1	2,127.1	1.01	0.85	25.74	
7,073.0	2.40	219.40	6,554.9	-2,010.3	700.9	2,128.9	0.74	0.74	-0.11	
7,167.0	1.10	223.30	6,648.9	-2,012.5	699.1	2,130.4	1.39	-1.38	4.15	
7,262.0	1.10	225.90	6,743.9	-2,013.8	697.8	2,131.2	0.05	0.00	2.74	
7,356.0	1.90	202.50	6,837.8	-2,015.9	696.5	2,132.8	1.06	0.85	-24.89	
7,450.0	2.50	209.30	6,931.8	-2,019.1	694.9	2,135.3	0.69	0.64	7.23	
7,544.0	2.70	210.00	7,025.7	-2,022.8	692.8	2,138.1	0.22	0.21	0.74	
7,639.0	2.90	208.40	7,120.6	-2,026.8	690.6	2,141.3	0.23	0.21	-1.68	
7,733.0	3.10	197.30	7,214.4	-2,031.4	688.7	2,144.9	0.65	0.21	-11.81	
7,827.0	3.40	200.40	7,308.3	-2,036.4	687.0	2,149.2	0.37	0.32	3.30	
7,921.0	3.60	200.80	7,402.1	-2,041.8	684.9	2,153.6	0.21	0.21	0.43	
8,015.0	3.00	206.20	7,495.9	-2,046.7	682.8	2,157.6	0.72	-0.64	5.74	
8,109.0	3.70	205.80	7,589.8	-2,051.7	680.4	2,161.5	0.75	0.74	-0.43	
8,154.0	3.40	207.00	7,634.7	-2,054.2	679.2	2,163.5	0.69	-0.67	2.67	
Projection to TD @ 8214.0' MD / 7694.6' TVD										
8,214.0	3.40	207.00	7,694.6	-2,057.3	677.5	2,166.0	0.00	0.00	0.00	



Survey Report



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Wellbore:	B-4	Survey Calculation Method:	Minimum Curvature
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Design Annotations					
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		+N/-S (usft)	+E/-W (usft)		
111.0	111.0	0.0	0.5	First MWD Survey @ 111.0' MD / 111.0' TVD	
8,214.0	7,694.6	-2,057.3	677.5	Projection to TD @ 8214.0' MD / 7694.6' TVD	