



Laramie Energy, LLC

Mesa County, CO

Bruton 30-10 Pad

Bruton 30-16E

B-6

Design: B-6

QES Survey Report

31 December, 2017





Survey Report



Company:	Laramie Energy, LLC	Local Co-ordinate Reference:	Well Bruton 30-16E
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 30-16E	North Reference:	True
Wellbore:	B-6	Survey Calculation Method:	Minimum Curvature
Design:	B-6	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 30-16E					
Well Position	+N/-S	0.0 usft	Northing:	1,523,579.34 usft	Latitude:	39.248144
	+E/-W	0.0 usft	Easting:	2,346,211.25 usft	Longitude:	-107.808872
Position Uncertainty		0.0 usft	Wellhead Elevation:	0.0 usft	Ground Level:	7,643.0 usft

Wellbore	B-6				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	12/21/2017	9.53	65.41	51,348.90744087

Design	B-6				
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	157.63	

Survey Program	Date	12/31/2017			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
111.0	7,939.0	QES MWD Surveys (B-6)	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	1.20	53.40	111.0	0.7	0.9	-0.3	1.08	1.08	0.00	
202.0	1.50	65.80	202.0	1.7	2.8	-0.6	0.46	0.33	13.63	
293.0	1.80	64.60	292.9	2.9	5.2	-0.7	0.33	0.33	-1.32	
384.0	1.80	37.70	383.9	4.6	7.3	-1.5	0.92	0.00	-29.56	
476.0	2.20	55.60	475.8	6.7	9.7	-2.5	0.80	0.43	19.46	
567.0	1.50	80.50	566.8	7.9	12.3	-2.6	1.15	-0.77	27.36	
658.0	1.40	124.90	657.8	7.5	14.4	-1.4	1.21	-0.11	48.79	
749.0	1.00	151.50	748.7	6.1	15.7	0.3	0.74	-0.44	29.23	
840.0	1.10	143.00	839.7	4.8	16.6	1.9	0.20	0.11	-9.34	



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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	1.50	134.30	930.7	3.2	17.9	3.9	0.49	0.44	-9.56
1,022.0	2.60	120.50	1,021.6	1.3	20.6	6.6	1.32	1.21	-15.16
1,117.0	2.30	142.60	1,116.6	-1.3	23.6	10.1	1.04	-0.32	23.26
1,211.0	4.20	173.50	1,210.4	-6.2	25.1	15.3	2.68	2.02	32.87
1,305.0	6.20	188.90	1,304.0	-14.6	24.7	22.9	2.58	2.13	16.38
1,399.0	8.90	183.40	1,397.2	-26.9	23.5	33.8	2.97	2.87	-5.85
1,507.0	11.80	169.60	1,503.4	-46.1	25.0	52.2	3.51	2.69	-12.78
1,587.0	12.10	168.40	1,581.7	-62.4	28.2	68.4	0.49	0.38	-1.50
1,681.0	13.90	158.70	1,673.3	-82.5	34.3	89.4	3.00	1.91	-10.32
1,775.0	15.90	157.00	1,764.1	-104.9	43.4	113.5	2.18	2.13	-1.81
1,869.0	18.80	152.50	1,853.9	-130.2	55.4	141.5	3.40	3.09	-4.79
1,963.0	20.90	154.60	1,942.3	-158.8	69.6	173.3	2.36	2.23	2.23
2,058.0	20.30	153.60	2,031.2	-188.9	84.2	206.7	0.73	-0.63	-1.05
2,152.0	19.30	153.20	2,119.6	-217.3	98.5	238.4	1.07	-1.06	-0.43
2,246.0	19.50	156.00	2,208.3	-245.5	111.8	269.6	1.01	0.21	2.98
2,340.0	18.70	155.80	2,297.1	-273.6	124.4	300.4	0.85	-0.85	-0.21
2,434.0	20.10	158.90	2,385.8	-302.4	136.4	331.6	1.85	1.49	3.30
2,528.0	19.20	158.30	2,474.3	-331.9	147.9	363.2	0.98	-0.96	-0.64
2,623.0	21.10	159.00	2,563.5	-362.3	159.8	395.9	2.02	2.00	0.74
2,717.0	19.80	158.90	2,651.6	-393.0	171.6	428.7	1.38	-1.38	-0.11
2,811.0	18.50	159.90	2,740.4	-421.8	182.5	459.6	1.43	-1.38	1.06
2,905.0	17.90	159.00	2,829.7	-449.3	192.8	488.9	0.70	-0.64	-0.96
2,999.0	20.40	159.30	2,918.5	-478.2	203.8	519.7	2.66	2.66	0.32
3,094.0	19.90	158.70	3,007.6	-508.7	215.5	552.4	0.57	-0.53	-0.63
3,188.0	18.90	158.90	3,096.3	-537.8	226.8	583.6	1.07	-1.06	0.21
3,282.0	20.30	160.10	3,184.9	-567.4	237.8	615.2	1.55	1.49	1.28
3,377.0	19.80	160.20	3,274.1	-598.0	248.9	647.7	0.53	-0.53	0.11
3,471.0	21.10	159.80	3,362.2	-628.8	260.1	680.5	1.39	1.38	-0.43
3,565.0	20.90	159.00	3,449.9	-660.4	271.9	714.2	0.37	-0.21	-0.85
3,659.0	20.30	158.70	3,537.9	-691.2	283.9	747.2	0.65	-0.64	-0.32
3,753.0	19.70	158.50	3,626.2	-721.2	295.6	779.4	0.64	-0.64	-0.21
3,848.0	21.20	159.50	3,715.3	-752.1	307.5	812.6	1.62	1.58	1.05
3,942.0	20.80	158.80	3,803.0	-783.6	319.5	846.2	0.50	-0.43	-0.74
4,036.0	20.20	158.40	3,891.1	-814.3	331.5	879.2	0.66	-0.64	-0.43
4,131.0	19.80	159.20	3,980.3	-844.6	343.2	911.6	0.51	-0.42	0.84
4,225.0	20.40	156.00	4,068.6	-874.4	355.6	943.9	1.33	0.64	-3.40
4,319.0	19.60	156.40	4,156.9	-903.8	368.5	976.1	0.86	-0.85	0.43
4,413.0	19.00	155.80	4,245.7	-932.2	381.1	1,007.1	0.67	-0.64	-0.64
4,507.0	20.30	155.60	4,334.2	-961.0	394.1	1,038.7	1.38	1.38	-0.21
4,602.0	21.00	155.80	4,423.1	-991.6	407.9	1,072.2	0.74	0.74	0.21
4,696.0	20.40	159.40	4,511.0	-1,022.3	420.6	1,105.4	1.50	-0.64	3.83
4,790.0	19.70	156.30	4,599.3	-1,052.1	432.7	1,137.6	1.35	-0.74	-3.30
4,885.0	17.50	152.60	4,689.4	-1,079.5	445.7	1,167.9	2.63	-2.32	-3.89



Survey Report



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Survey										
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4,979.0	16.50	153.00	4,779.2	-1,103.9	458.3	1,195.3	1.07	-1.06	0.43	
5,073.0	15.80	151.00	4,869.5	-1,127.0	470.6	1,221.3	0.95	-0.74	-2.13	
5,168.0	14.80	152.40	4,961.2	-1,149.1	482.5	1,246.2	1.12	-1.05	1.47	
5,262.0	13.90	153.60	5,052.2	-1,169.8	493.0	1,269.4	1.01	-0.96	1.28	
5,356.0	12.80	147.90	5,143.7	-1,188.8	503.6	1,291.0	1.82	-1.17	-6.06	
5,450.0	11.90	148.50	5,235.5	-1,205.8	514.2	1,310.8	0.97	-0.96	0.64	
5,544.0	10.30	139.00	5,327.8	-1,220.5	524.8	1,328.3	2.58	-1.70	-10.11	
5,638.0	7.80	139.90	5,420.6	-1,231.7	534.4	1,342.4	2.66	-2.66	0.96	
5,733.0	4.60	130.00	5,515.0	-1,239.1	541.5	1,351.9	3.54	-3.37	-10.42	
5,827.0	1.70	103.40	5,608.9	-1,241.8	545.7	1,356.0	3.37	-3.09	-28.30	
5,921.0	0.80	87.00	5,702.9	-1,242.1	547.7	1,357.1	1.02	-0.96	-17.45	
6,015.0	0.60	90.60	5,796.8	-1,242.1	548.9	1,357.5	0.22	-0.21	3.83	
6,110.0	0.70	117.40	5,891.8	-1,242.3	549.9	1,358.1	0.33	0.11	28.21	
6,204.0	0.70	138.20	5,985.8	-1,243.0	550.8	1,359.1	0.27	0.00	22.13	
6,298.0	0.70	135.90	6,079.8	-1,243.9	551.6	1,360.2	0.03	0.00	-2.45	
6,392.0	0.70	176.90	6,173.8	-1,244.9	552.0	1,361.2	0.52	0.00	43.62	
6,487.0	0.90	215.90	6,268.8	-1,246.0	551.6	1,362.2	0.60	0.21	41.05	
6,581.0	0.80	212.30	6,362.8	-1,247.2	550.8	1,363.0	0.12	-0.11	-3.83	
6,675.0	1.20	217.10	6,456.8	-1,248.5	549.8	1,363.8	0.43	0.43	5.11	
6,769.0	1.60	224.90	6,550.8	-1,250.2	548.3	1,364.8	0.47	0.43	8.30	
6,863.0	2.20	222.80	6,644.7	-1,252.5	546.2	1,366.1	0.64	0.64	-2.23	
6,957.0	2.60	219.40	6,738.6	-1,255.5	543.6	1,367.9	0.45	0.43	-3.62	
7,051.0	2.80	221.40	6,832.5	-1,258.8	540.7	1,369.9	0.24	0.21	2.13	
7,146.0	3.40	225.00	6,927.4	-1,262.6	537.2	1,372.0	0.66	0.63	3.79	
7,240.0	3.60	225.30	7,021.2	-1,266.6	533.1	1,374.2	0.21	0.21	0.32	
7,334.0	3.90	220.00	7,115.0	-1,271.1	529.0	1,376.8	0.49	0.32	-5.64	
7,428.0	4.10	224.10	7,208.8	-1,276.0	524.6	1,379.6	0.37	0.21	4.36	
7,522.0	3.80	229.90	7,302.6	-1,280.4	519.9	1,381.9	0.53	-0.32	6.17	
7,616.0	3.90	230.20	7,396.3	-1,284.5	515.0	1,383.8	0.11	0.11	0.32	
7,710.0	3.90	235.10	7,490.1	-1,288.4	509.9	1,385.5	0.35	0.00	5.21	
7,805.0	3.80	234.00	7,584.9	-1,292.0	504.8	1,386.9	0.13	-0.11	-1.16	
7,879.0	3.80	234.30	7,658.7	-1,294.9	500.8	1,388.1	0.03	0.00	0.41	
Projection to TD @ 7939.0' MD / 7718.6' TVD										
7,939.0	3.80	234.30	7,718.6	-1,297.2	497.5	1,389.0	0.00	0.00	0.00	

Design Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment	
		+N/-S (usft)	+E/-W (usft)		
111.0	111.0	0.7	0.9	First MWD Survey @ 111.0' MD / 111.0' TVD	
7,939.0	7,718.6	-1,297.2	497.5	Projection to TD @ 7939.0' MD / 7718.6' TVD	



Survey Report



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