



# **Laramie Energy, LLC**

**Mesa County, CO**

**Bruton 30-01 Pad**

**Bruton 19-17E**

**Wellbore #1**

**Design: Wellbore #1**

## **QES Survey Report**

**21 July, 2017**





# Survey Report



<b>Company:</b>	Laramie Energy, LLC	<b>Local Co-ordinate Reference:</b>	Well Bruton 19-17E
<b>Project:</b>	Mesa County, CO	<b>TVD Reference:</b>	well @ 7449.0usft (H&P #290)
<b>Site:</b>	Bruton 30-01 Pad	<b>MD Reference:</b>	well @ 7449.0usft (H&P #290)
<b>Well:</b>	Bruton 19-17E	<b>North Reference:</b>	True
<b>Wellbore:</b>	Wellbore #1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Wellbore #1	<b>Database:</b>	EDM 5000.1 Single User Db

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

<b>Site</b>	Bruton 30-01 Pad				
<b>Site Position:</b>		<b>Northing:</b>	1,526,078.02 usft	<b>Latitude:</b>	39.255061
<b>From:</b>	Lat/Long	<b>Easting:</b>	2,347,056.81 usft	<b>Longitude:</b>	-107.806111
<b>Position Uncertainty:</b>	0.0 usft	<b>Slot Radius:</b>	13-3/16 "	<b>Grid Convergence:</b>	-1.45 °

Well	Bruton 19-17E					
Well Position	+N/-S	0.0 usft	Northing:	1,526,154.54 usft	Latitude:	39.255270
	+E/-W	0.0 usft	Easting:	2,347,032.00 usft	Longitude:	-107.806206
Position Uncertainty		0.0 usft	Wellhead Elevation:	0.0 usft	Ground Level:	7,425.0 usft

<b>Wellbore</b>	Wellbore #1				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	IGRF2015	1/5/2017	9.63	65.43	51,461.34890467

<b>Design</b>	Wellbore #1				
<b>Audit Notes:</b>					
<b>Version:</b>	1.0	<b>Phase:</b>	ACTUAL	<b>Tie On Depth:</b>	0.0
<b>Vertical Section:</b>	<b>Depth From (TVD) (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Direction (°)</b>	
	0.0	0.0	0.0	348.81	

<b>Survey Program</b>	<b>Date</b>	7/21/2017			
<b>From (usft)</b>	<b>To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
203.0	7,900.0	MWD Survey (Wellbore #1)	MWD	MWD - Standard	

<b>Survey</b>									
<b>Measured Depth (usft)</b>	<b>Inclination (°)</b>	<b>Azimuth (°)</b>	<b>Vertical Depth (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Vertical Section (usft)</b>	<b>Dogleg Rate (°/100usft)</b>	<b>Build Rate (°/100usft)</b>	<b>Turn Rate (°/100usft)</b>
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00
<b>First MWD Survey @ 203.0' MD / TVD</b>									
203.0	0.30	143.30	203.0	-0.4	0.3	-0.5	0.15	0.15	0.00
294.0	0.20	286.50	294.0	-0.6	0.3	-0.6	0.52	-0.11	157.36
385.0	0.00	279.60	385.0	-0.5	0.2	-0.5	0.22	-0.22	0.00
475.0	0.10	13.50	475.0	-0.5	0.2	-0.5	0.11	0.11	0.00
565.0	0.70	228.00	565.0	-0.7	-0.2	-0.7	0.87	0.67	-161.67
656.0	0.40	134.30	656.0	-1.3	-0.4	-1.2	0.91	-0.33	-102.97
747.0	0.30	34.90	747.0	-1.4	0.0	-1.3	0.59	-0.11	-109.23
837.0	0.10	61.20	837.0	-1.1	0.2	-1.1	0.24	-0.22	29.22
932.0	1.50	3.00	932.0	0.2	0.3	0.1	1.53	1.47	-61.26



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<b>Site:</b>	Bruton 30-01 Pad	<b>MD Reference:</b>	well @ 7449.0usft (H&P #290)
<b>Well:</b>	Bruton 19-17E	<b>North Reference:</b>	True
<b>Wellbore:</b>	Wellbore #1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Wellbore #1	<b>Database:</b>	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)
1,026.0	3.50	358.80	1,025.9	4.2	0.3	4.1	2.14	2.13	-4.47
1,121.0	5.40	0.40	1,120.6	11.6	0.3	11.3	2.00	2.00	1.68
1,216.0	8.70	351.70	1,214.9	23.2	-0.7	22.9	3.64	3.47	-9.16
1,310.0	10.80	352.20	1,307.5	39.0	-3.0	38.8	2.24	2.23	0.53
1,404.0	13.50	351.00	1,399.4	58.5	-5.9	58.6	2.88	2.87	-1.28
1,499.0	15.20	350.10	1,491.4	81.8	-9.7	82.1	1.80	1.79	-0.95
1,591.0	15.30	348.40	1,580.2	105.5	-14.3	106.3	0.50	0.11	-1.85
1,685.0	14.80	347.40	1,671.0	129.4	-19.4	130.7	0.60	-0.53	-1.06
1,779.0	14.50	347.40	1,761.9	152.6	-24.6	154.5	0.32	-0.32	0.00
1,874.0	15.70	353.20	1,853.6	177.0	-28.7	179.2	2.03	1.26	6.11
1,969.0	15.10	353.80	1,945.2	202.0	-31.5	204.3	0.65	-0.63	0.63
2,063.0	14.30	353.70	2,036.1	225.7	-34.1	228.1	0.85	-0.85	-0.11
2,158.0	14.90	350.80	2,128.1	249.5	-37.4	252.0	1.00	0.63	-3.05
2,252.0	16.00	351.20	2,218.7	274.2	-41.3	277.0	1.18	1.17	0.43
2,346.0	15.20	350.30	2,309.2	299.1	-45.3	302.3	0.89	-0.85	-0.96
2,441.0	16.40	350.60	2,400.6	324.6	-49.6	328.1	1.27	1.26	0.32
2,535.0	16.80	346.70	2,490.7	351.0	-54.9	354.9	1.26	0.43	-4.15
2,630.0	15.80	345.70	2,581.9	376.9	-61.3	381.6	1.09	-1.05	-1.05
2,724.0	14.90	344.40	2,672.5	400.9	-67.7	406.4	1.02	-0.96	-1.38
2,818.0	15.70	347.00	2,763.2	424.9	-73.8	431.2	1.12	0.85	2.77
2,913.0	16.90	350.90	2,854.4	451.1	-78.9	457.8	1.71	1.26	4.11
3,008.0	16.60	350.60	2,945.4	478.1	-83.3	485.2	0.33	-0.32	-0.32
3,102.0	16.10	350.30	3,035.5	504.2	-87.7	511.6	0.54	-0.53	-0.32
3,197.0	15.40	349.90	3,127.0	529.6	-92.1	537.4	0.75	-0.74	-0.42
3,292.0	14.70	349.70	3,218.7	553.9	-96.5	562.1	0.74	-0.74	-0.21
3,386.0	16.10	351.50	3,309.3	578.5	-100.5	587.0	1.57	1.49	1.91
3,481.0	17.40	348.30	3,400.3	605.5	-105.3	614.4	1.68	1.37	-3.37
3,576.0	16.90	347.90	3,491.1	632.9	-111.1	642.4	0.54	-0.53	-0.42
3,670.0	16.40	346.50	3,581.1	659.1	-117.1	669.3	0.68	-0.53	-1.49
3,765.0	15.80	345.80	3,672.4	684.7	-123.4	695.6	0.66	-0.63	-0.74
3,859.0	15.00	345.50	3,763.0	708.9	-129.6	720.6	0.86	-0.85	-0.32
3,954.0	16.40	347.90	3,854.5	733.9	-135.5	746.2	1.62	1.47	2.53
4,049.0	16.00	348.10	3,945.7	759.8	-141.0	772.7	0.43	-0.42	0.21
4,143.0	14.90	347.60	4,036.3	784.3	-146.2	797.8	1.18	-1.17	-0.53
4,238.0	14.00	348.10	4,128.3	807.5	-151.2	821.5	0.96	-0.95	0.53
4,333.0	15.60	349.60	4,220.2	831.3	-155.9	845.7	1.73	1.68	1.58
4,427.0	16.60	352.10	4,310.5	857.0	-160.0	871.8	1.29	1.06	2.66
4,522.0	15.60	351.50	4,401.8	883.1	-163.8	898.1	1.07	-1.05	-0.63
4,616.0	14.80	348.80	4,492.5	907.4	-168.0	922.7	1.14	-0.85	-2.87
4,711.0	15.20	353.00	4,584.2	931.6	-171.9	947.3	1.22	0.42	4.42
4,805.0	16.10	353.20	4,674.7	956.8	-174.9	972.6	0.96	0.96	0.21
4,900.0	15.20	353.00	4,766.2	982.3	-178.0	998.1	0.95	-0.95	-0.21
4,994.0	13.00	352.50	4,857.4	1,005.0	-180.9	1,021.0	2.34	-2.34	-0.53



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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)
5,089.0	12.90	350.80	4,950.0	1,026.0	-184.0	1,042.2	0.41	-0.11	-1.79
5,184.0	14.50	352.50	5,042.3	1,048.3	-187.2	1,064.7	1.74	1.68	1.79
5,278.0	16.40	348.40	5,132.9	1,073.0	-191.4	1,089.7	2.33	2.02	-4.36
5,373.0	15.20	347.50	5,224.3	1,098.3	-196.8	1,115.6	1.29	-1.26	-0.95
5,468.0	14.30	347.90	5,316.1	1,121.9	-202.0	1,139.8	0.95	-0.95	0.42
5,562.0	12.80	345.70	5,407.5	1,143.3	-207.0	1,161.8	1.69	-1.60	-2.34
5,657.0	11.10	342.50	5,500.5	1,162.3	-212.3	1,181.4	1.92	-1.79	-3.37
5,751.0	8.90	341.00	5,593.0	1,177.8	-217.4	1,197.6	2.36	-2.34	-1.60
5,846.0	6.90	343.30	5,687.1	1,190.2	-221.4	1,210.5	2.13	-2.11	2.42
5,941.0	5.50	341.90	5,781.6	1,200.0	-224.5	1,220.7	1.48	-1.47	-1.47
6,035.0	3.00	359.20	5,875.3	1,206.7	-225.9	1,227.6	2.96	-2.66	18.40
6,130.0	2.90	0.00	5,970.2	1,211.6	-226.0	1,232.4	0.11	-0.11	0.84
6,224.0	1.80	356.20	6,064.1	1,215.5	-226.1	1,236.2	1.18	-1.17	-4.04
6,319.0	0.70	263.60	6,159.1	1,216.9	-226.7	1,237.7	2.06	-1.16	-97.47
6,413.0	0.60	257.10	6,253.1	1,216.7	-227.8	1,237.8	0.13	-0.11	-6.91
6,508.0	0.70	270.60	6,348.1	1,216.6	-228.8	1,237.9	0.19	0.11	14.21
6,602.0	0.96	270.80	6,442.1	1,216.6	-230.2	1,238.2	0.28	0.28	0.21
6,697.0	1.00	252.30	6,537.0	1,216.4	-231.8	1,238.2	0.33	0.04	-19.47
6,792.0	0.65	210.20	6,632.0	1,215.7	-232.9	1,237.7	0.71	-0.37	-44.32
6,886.0	0.83	186.50	6,726.0	1,214.5	-233.2	1,236.7	0.37	0.19	-25.21
6,981.0	0.30	199.80	6,821.0	1,213.6	-233.4	1,235.8	0.57	-0.56	14.00
7,076.0	0.20	156.70	6,916.0	1,213.2	-233.4	1,235.4	0.22	-0.11	-45.37
7,170.0	0.10	266.10	7,010.0	1,213.1	-233.4	1,235.3	0.27	-0.11	116.38
7,265.0	0.04	18.50	7,105.0	1,213.1	-233.5	1,235.3	0.13	-0.06	118.32
7,360.0	0.96	312.00	7,200.0	1,213.7	-234.0	1,236.0	0.99	0.97	-70.00
7,455.0	0.52	324.10	7,295.0	1,214.5	-234.9	1,237.0	0.49	-0.46	12.74
7,549.0	0.74	241.60	7,389.0	1,214.6	-235.7	1,237.2	0.90	0.23	-87.77
7,644.0	1.20	239.90	7,484.0	1,213.8	-237.1	1,236.7	0.49	0.48	-1.79
7,739.0	1.10	232.30	7,579.0	1,212.7	-238.7	1,236.0	0.19	-0.11	-8.00
7,840.0	1.30	222.40	7,680.0	1,211.3	-240.2	1,234.9	0.28	0.20	-9.80
Projection to TD @ 7900.0' MD / 7739.9' TVD									
7,900.0	1.30	222.40	7,739.9	1,210.3	-241.1	1,234.1	0.00	0.00	0.00

Design Annotations				
Measured Depth (usft)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Comment
203.0	203.0	-0.4	0.3	First MWD Survey @ 203.0' MD / TVD
7,900.0	7,739.9	1,210.3	-241.1	Projection to TD @ 7900.0' MD / 7739.9' TVD