



# **Laramie Energy, LLC**

**Mesa County, CO**

**Bruton 30-01 Pad**

**Bruton 19-14E**

**Wellbore #1**

**Design: Wellbore #1**

## **QES Survey Report**

**31 July, 2017**





# Survey Report



<b>Company:</b>	Laramie Energy, LLC	<b>Local Co-ordinate Reference:</b>	Well Bruton 19-14E
<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 19-14E	<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 19-14E					
Well Position	+N/-S	0.0 usft	Northing:	1,526,159.94 usft	Latitude:	39.255283
	+E/-W	0.0 usft	Easting:	2,347,018.76 usft	Longitude:	-107.806253
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	7/20/2017	9.58	65.42	51,401.70471952

<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	354.10	

<b>Survey Program</b>	<b>Date</b>	7/31/2017			
<b>From (usft)</b>	<b>To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
108.0	8,165.0	MWD Surveys (Wellbore #1)	MWD default	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 @ 108.0' MD / 108.0' TVD</b>										
108.0	0.80	356.00	108.0	0.8	-0.1	0.8	0.74	0.74	0.00	
199.0	1.30	345.80	199.0	2.4	-0.4	2.4	0.58	0.55	-11.21	
289.0	0.60	356.80	289.0	3.8	-0.6	3.9	0.80	-0.78	12.22	
381.0	0.40	17.50	381.0	4.6	-0.6	4.7	0.29	-0.22	22.50	
471.0	2.20	356.20	470.9	6.7	-0.6	6.7	2.04	2.00	-23.67	
563.0	4.60	2.40	562.8	12.1	-0.5	12.1	2.64	2.61	6.74	
654.0	6.90	355.40	653.3	21.2	-0.8	21.2	2.64	2.53	-7.69	
745.0	8.90	354.60	743.4	33.7	-1.9	33.7	2.20	2.20	-0.88	
836.0	11.50	353.50	833.0	49.7	-3.6	49.8	2.87	2.86	-1.21	



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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 19-14E	<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)
927.0	14.30	353.10	921.7	69.9	-6.0	70.1	3.08	3.08	-0.44
1,021.0	16.30	354.20	1,012.4	94.5	-8.7	94.9	2.15	2.13	1.17
1,116.0	18.70	354.00	1,102.9	122.9	-11.7	123.5	2.53	2.53	-0.21
1,210.0	20.30	354.40	1,191.6	154.1	-14.8	154.8	1.71	1.70	0.43
1,305.0	21.10	352.60	1,280.4	187.5	-18.6	188.4	1.08	0.84	-1.89
1,399.0	24.10	354.20	1,367.2	223.4	-22.8	224.5	3.26	3.19	1.70
1,494.0	24.80	353.90	1,453.7	262.5	-26.8	263.9	0.75	0.74	-0.32
1,588.0	25.40	353.70	1,538.8	302.1	-31.1	303.7	0.64	0.64	-0.21
1,683.0	25.80	352.30	1,624.5	342.9	-36.1	344.8	0.76	0.42	-1.47
1,777.0	25.20	356.00	1,709.3	383.1	-40.3	385.2	1.81	-0.64	3.94
1,871.0	25.30	355.90	1,794.3	423.1	-43.1	425.3	0.12	0.11	-0.11
1,966.0	24.60	356.70	1,880.5	463.1	-45.7	465.3	0.82	-0.74	0.84
2,061.0	23.30	356.40	1,967.3	501.6	-48.0	503.9	1.37	-1.37	-0.32
2,155.0	24.50	356.70	2,053.2	539.6	-50.3	541.9	1.28	1.28	0.32
2,249.0	25.30	356.70	2,138.5	579.1	-52.6	581.4	0.85	0.85	0.00
2,344.0	24.60	357.90	2,224.6	619.1	-54.5	621.5	0.91	-0.74	1.26
2,438.0	24.50	354.20	2,310.1	658.1	-57.2	660.5	1.64	-0.11	-3.94
2,533.0	23.70	355.60	2,396.9	696.7	-60.6	699.3	1.03	-0.84	1.47
2,627.0	23.20	354.50	2,483.1	734.0	-63.9	736.7	0.71	-0.53	-1.17
2,722.0	23.20	351.80	2,570.4	771.1	-68.3	774.1	1.12	0.00	-2.84
2,816.0	24.10	351.90	2,656.5	808.5	-73.7	811.7	0.96	0.96	0.11
2,910.0	23.80	351.20	2,742.4	846.2	-79.3	849.9	0.44	-0.32	-0.74
3,005.0	23.70	351.70	2,829.4	884.0	-85.0	888.1	0.24	-0.11	0.53
3,100.0	23.80	350.50	2,916.3	921.8	-90.9	926.3	0.52	0.11	-1.26
3,194.0	24.20	352.40	3,002.2	959.6	-96.6	964.5	0.93	0.43	2.02
3,289.0	24.00	353.10	3,088.9	998.1	-101.4	1,003.3	0.37	-0.21	0.74
3,384.0	24.00	352.10	3,175.7	1,036.4	-106.4	1,041.9	0.43	0.00	-1.05
3,478.0	23.30	351.40	3,261.8	1,073.8	-111.8	1,079.6	0.80	-0.74	-0.74
3,573.0	23.00	353.30	3,349.2	1,110.8	-116.8	1,116.9	0.85	-0.32	2.00
3,667.0	23.60	356.60	3,435.5	1,147.8	-120.1	1,154.0	1.53	0.64	3.51
3,762.0	23.60	354.70	3,522.6	1,185.7	-123.0	1,192.1	0.80	0.00	-2.00
3,857.0	23.50	355.20	3,609.6	1,223.5	-126.3	1,230.0	0.24	-0.11	0.53
3,951.0	22.90	353.80	3,696.0	1,260.4	-129.8	1,267.0	0.87	-0.64	-1.49
4,046.0	23.20	354.90	3,783.5	1,297.4	-133.5	1,304.2	0.55	0.32	1.16
4,141.0	24.60	354.50	3,870.3	1,335.7	-137.1	1,342.7	1.48	1.47	-0.42
4,235.0	24.40	355.20	3,955.9	1,374.5	-140.6	1,381.7	0.38	-0.21	0.74
4,330.0	23.70	353.10	4,042.6	1,413.0	-144.5	1,420.4	1.16	-0.74	-2.21
4,425.0	23.80	356.00	4,129.6	1,451.1	-148.1	1,458.7	1.23	0.11	3.05
4,519.0	24.00	355.80	4,215.5	1,489.1	-150.8	1,496.7	0.23	0.21	-0.21
4,614.0	23.50	355.30	4,302.5	1,527.3	-153.8	1,535.0	0.57	-0.53	-0.53
4,708.0	23.30	355.70	4,388.7	1,564.5	-156.7	1,572.3	0.27	-0.21	0.43
4,803.0	22.70	353.00	4,476.2	1,601.4	-160.4	1,609.4	1.28	-0.63	-2.84
4,897.0	22.50	356.40	4,563.0	1,637.4	-163.7	1,645.5	1.41	-0.21	3.62



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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)
4,992.0	22.60	356.30	4,650.7	1,673.7	-166.0	1,681.9	0.11	0.11	-0.11
5,086.0	23.40	357.10	4,737.2	1,710.4	-168.2	1,718.6	0.91	0.85	0.85
5,181.0	23.10	358.80	4,824.5	1,747.8	-169.5	1,756.0	0.77	-0.32	1.79
5,276.0	21.80	357.90	4,912.3	1,784.1	-170.5	1,792.2	1.42	-1.37	-0.95
5,370.0	20.70	358.20	4,999.9	1,818.2	-171.7	1,826.2	1.18	-1.17	0.32
5,465.0	18.70	357.20	5,089.4	1,850.2	-173.0	1,858.1	2.13	-2.11	-1.05
5,560.0	16.90	356.20	5,179.8	1,879.1	-174.6	1,887.1	1.92	-1.89	-1.05
5,654.0	15.70	356.50	5,270.0	1,905.5	-176.3	1,913.5	1.28	-1.28	0.32
5,749.0	14.20	354.60	5,361.8	1,929.9	-178.2	1,938.0	1.66	-1.58	-2.00
5,843.0	11.80	355.30	5,453.4	1,951.0	-180.1	1,959.1	2.56	-2.55	0.74
5,938.0	10.20	352.30	5,546.6	1,969.0	-182.0	1,977.3	1.79	-1.68	-3.16
6,032.0	8.20	351.50	5,639.4	1,983.9	-184.1	1,992.3	2.13	-2.13	-0.85
6,127.0	5.80	349.80	5,733.7	1,995.3	-185.9	2,003.8	2.54	-2.53	-1.79
6,222.0	4.40	354.00	5,828.3	2,003.6	-187.2	2,012.3	1.52	-1.47	4.42
6,316.0	5.00	355.40	5,922.0	2,011.3	-187.9	2,020.0	0.65	0.64	1.49
6,410.0	4.40	353.40	6,015.7	2,019.0	-188.6	2,027.7	0.66	-0.64	-2.13
6,505.0	3.90	358.60	6,110.5	2,025.8	-189.1	2,034.5	0.66	-0.53	5.47
6,600.0	2.80	10.60	6,205.3	2,031.3	-188.8	2,040.0	1.37	-1.16	12.63
6,694.0	1.80	0.30	6,299.2	2,035.1	-188.3	2,043.6	1.15	-1.06	-10.96
6,789.0	0.30	23.50	6,394.2	2,036.8	-188.2	2,045.3	1.61	-1.58	24.42
6,884.0	0.10	176.60	6,489.2	2,036.9	-188.1	2,045.5	0.41	-0.21	161.16
6,978.0	0.40	201.40	6,583.2	2,036.5	-188.2	2,045.1	0.33	0.32	26.38
7,073.0	0.60	230.00	6,678.2	2,035.9	-188.7	2,044.5	0.33	0.21	30.11
7,168.0	0.70	248.30	6,773.2	2,035.4	-189.7	2,044.1	0.24	0.11	19.26
7,262.0	0.20	240.00	6,867.2	2,035.1	-190.3	2,043.9	0.54	-0.53	-8.83
7,357.0	0.30	279.60	6,962.2	2,035.0	-190.7	2,043.9	0.20	0.11	41.68
7,452.0	0.70	228.50	7,057.2	2,034.7	-191.4	2,043.6	0.59	0.42	-53.79
7,547.0	1.00	240.10	7,152.2	2,033.9	-192.6	2,042.9	0.36	0.32	12.21
7,641.0	1.10	252.10	7,246.1	2,033.2	-194.1	2,042.4	0.26	0.11	12.77
7,736.0	1.40	268.20	7,341.1	2,032.9	-196.2	2,042.3	0.48	0.32	16.95
7,831.0	1.10	259.90	7,436.1	2,032.7	-198.2	2,042.3	0.37	-0.32	-8.74
7,925.0	1.00	245.30	7,530.1	2,032.2	-199.9	2,042.0	0.30	-0.11	-15.53
8,020.0	1.70	246.40	7,625.1	2,031.3	-201.9	2,041.3	0.74	0.74	1.16
8,109.0	2.00	247.40	7,714.0	2,030.2	-204.5	2,040.4	0.34	0.34	1.12
Projection to TD @ 8165.0' MD / 7770.0' TVD									
8,165.0	2.00	247.40	7,770.0	2,029.4	-206.3	2,039.9	0.00	0.00	0.00



## Survey Report



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### Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
108.0	108.0	0.8	-0.1	First MWD Survey @ 108.0' MD / 108.0' TVD
8,165.0	7,770.0	2,029.4	-206.3	Projection to TD @ 8165.0' MD / 7770.0' TVD