



# **Laramie Energy, LLC**

**Mesa County, CO**

**Bruton 19-06 Pad**

**Bruton Federal 19-07E**

**Wellbore #1**

**Design: Wellbore #1**

## **QES Survey Report**

**28 September, 2017**





# Survey Report



<b>Company:</b>	Laramie Energy, LLC	<b>Local Co-ordinate Reference:</b>	Well Bruton Federal 19-07E
<b>Project:</b>	Mesa County, CO	<b>TVD Reference:</b>	well @ 7286.0usft (H&P #290)
<b>Site:</b>	Bruton 19-06 Pad	<b>MD Reference:</b>	well @ 7286.0usft (H&P #290)
<b>Well:</b>	Bruton Federal 19-07E	<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		

Site		Bruton 19-06 Pad			
Site Position:		Northing:	1,528,940.55 usft	Latitude:	39.262756
From:	Lat/Long	Easting:	2,344,737.10 usft	Longitude:	-107.814558
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	-1.46 °

Well	Bruton Federal 19-07E					
Well Position	+N/-S	0.0 usft	Northing:	1,528,995.36 usft	Latitude:	39.262897
	+E/-W	0.0 usft	Easting:	2,344,604.66 usft	Longitude:	-107.815031
Position Uncertainty		0.0 usft	Wellhead Elevation:	0.0 usft	Ground Level:	7,262.0 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	9/18/2017	9.56	65.42	51,387.72878539

<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	69.87	

<b>Survey Program</b>	<b>Date</b>	9/28/2017			
<b>From (usft)</b>	<b>To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
294.0	8,214.0	QES 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 @ 294.0' MD / 293.9' TVD</b>									
294.0	1.90	70.00	293.9	1.7	4.6	4.9	0.65	0.65	0.00
385.0	3.00	81.60	384.9	2.5	8.4	8.7	1.32	1.21	12.75
475.0	5.00	74.50	474.6	3.9	14.5	14.9	2.29	2.22	-7.89
566.0	6.80	70.40	565.2	6.8	23.4	24.3	2.03	1.98	-4.51
657.0	9.50	69.20	655.2	11.3	35.5	37.2	2.97	2.97	-1.32
748.0	12.40	68.50	744.6	17.5	51.6	54.5	3.19	3.19	-0.77
839.0	15.80	67.60	832.8	25.8	72.1	76.6	3.74	3.74	-0.99
929.0	19.60	70.20	918.5	35.6	97.7	104.0	4.31	4.22	2.89
1,024.0	24.10	71.30	1,006.7	47.2	131.0	139.3	4.76	4.74	1.16



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<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)
1,118.0	28.10	70.50	1,091.1	60.8	170.1	180.6	4.27	4.26	-0.85
1,213.0	31.10	69.00	1,173.7	77.0	214.1	227.5	3.25	3.16	-1.58
1,308.0	31.60	68.10	1,254.8	95.1	260.1	277.0	0.72	0.53	-0.95
1,403.0	31.50	70.30	1,335.8	112.8	306.6	326.7	1.22	-0.11	2.32
1,498.0	32.50	70.00	1,416.3	129.9	353.9	377.0	1.07	1.05	-0.32
1,592.0	33.10	69.20	1,495.3	147.6	401.6	427.9	0.79	0.64	-0.85
1,686.0	31.70	68.60	1,574.7	165.7	448.6	478.3	1.53	-1.49	-0.64
1,781.0	30.80	68.40	1,655.9	183.8	494.5	527.5	0.95	-0.95	-0.21
1,875.0	29.80	67.80	1,737.1	201.5	538.5	574.9	1.11	-1.06	-0.64
1,970.0	30.50	69.20	1,819.2	219.0	582.9	622.6	1.04	0.74	1.47
2,064.0	29.30	69.40	1,900.7	235.5	626.7	669.5	1.28	-1.28	0.21
2,159.0	30.80	68.90	1,982.9	252.5	671.2	717.1	1.60	1.58	-0.53
2,254.0	29.20	68.80	2,065.2	269.6	715.5	764.6	1.69	-1.68	-0.11
2,348.0	30.10	70.20	2,146.9	285.9	759.0	811.1	1.21	0.96	1.49
2,443.0	28.50	70.00	2,229.8	301.7	802.7	857.5	1.69	-1.68	-0.21
2,537.0	29.80	69.80	2,311.8	317.4	845.7	903.3	1.39	1.38	-0.21
2,632.0	28.30	69.20	2,394.9	333.6	889.0	949.5	1.61	-1.58	-0.63
2,726.0	29.30	69.60	2,477.3	349.5	931.3	994.7	1.08	1.06	0.43
2,821.0	28.20	69.60	2,560.6	365.4	974.2	1,040.4	1.16	-1.16	0.00
2,915.0	29.60	70.30	2,642.8	381.0	1,016.8	1,085.9	1.53	1.49	0.74
3,010.0	28.70	70.00	2,725.8	396.7	1,060.4	1,132.1	0.96	-0.95	-0.32
3,105.0	27.20	70.20	2,809.7	411.9	1,102.2	1,176.7	1.58	-1.58	0.21
3,199.0	28.90	70.60	2,892.7	426.7	1,143.9	1,220.9	1.82	1.81	0.43
3,294.0	30.10	70.70	2,975.4	442.2	1,188.0	1,267.6	1.26	1.26	0.11
3,388.0	29.20	70.60	3,057.1	457.6	1,231.9	1,314.1	0.96	-0.96	-0.11
3,483.0	28.30	71.20	3,140.3	472.6	1,275.1	1,359.8	0.99	-0.95	0.63
3,578.0	29.30	69.10	3,223.6	488.1	1,318.1	1,405.6	1.50	1.05	-2.21
3,672.0	28.50	69.30	3,305.9	504.3	1,360.6	1,451.0	0.86	-0.85	0.21
3,767.0	29.90	68.70	3,388.8	520.9	1,403.8	1,497.3	1.51	1.47	-0.63
3,861.0	28.90	69.00	3,470.7	537.5	1,446.9	1,543.5	1.08	-1.06	0.32
3,956.0	27.90	69.20	3,554.3	553.6	1,489.1	1,588.7	1.06	-1.05	0.21
4,050.0	29.20	68.60	3,636.8	569.8	1,531.0	1,633.6	1.42	1.38	-0.64
4,145.0	28.50	68.00	3,720.0	586.8	1,573.6	1,679.4	0.80	-0.74	-0.63
4,240.0	28.00	68.70	3,803.7	603.3	1,615.4	1,724.3	0.63	-0.53	0.74
4,334.0	26.70	68.50	3,887.2	619.1	1,655.6	1,767.5	1.39	-1.38	-0.21
4,429.0	28.30	69.40	3,971.5	634.9	1,696.5	1,811.4	1.74	1.68	0.95
4,523.0	29.80	69.10	4,053.7	651.0	1,739.2	1,857.0	1.60	1.60	-0.32
4,618.0	28.90	69.60	4,136.5	667.4	1,782.8	1,903.6	0.98	-0.95	0.53
4,713.0	28.30	69.60	4,219.9	683.3	1,825.4	1,949.0	0.63	-0.63	0.00
4,807.0	28.90	69.90	4,302.4	698.9	1,867.6	1,994.0	0.66	0.64	0.32
4,902.0	28.30	69.10	4,385.8	714.8	1,910.2	2,039.5	0.75	-0.63	-0.84
4,997.0	27.10	68.90	4,469.9	730.6	1,951.4	2,083.7	1.27	-1.26	-0.21
5,091.0	27.10	68.80	4,553.6	746.1	1,991.4	2,126.5	0.05	0.00	-0.11



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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)	
5,186.0	26.10	69.00	4,638.5	761.4	2,031.1	2,169.0	1.06	-1.05	0.21	
5,281.0	25.00	68.90	4,724.3	776.1	2,069.3	2,210.0	1.16	-1.16	-0.11	
5,375.0	24.00	68.80	4,809.8	790.2	2,105.6	2,249.0	1.06	-1.06	-0.11	
5,469.0	21.80	69.30	4,896.4	803.2	2,139.8	2,285.5	2.35	-2.34	0.53	
5,564.0	20.70	69.20	4,984.9	815.4	2,172.0	2,320.0	1.16	-1.16	-0.11	
5,658.0	18.60	68.50	5,073.4	826.8	2,201.5	2,351.6	2.25	-2.23	-0.74	
5,753.0	16.50	70.70	5,164.0	836.9	2,228.3	2,380.2	2.32	-2.21	2.32	
5,847.0	13.50	70.00	5,254.8	845.0	2,251.2	2,404.5	3.20	-3.19	-0.74	
5,942.0	10.80	71.30	5,347.7	851.7	2,270.1	2,424.5	2.86	-2.84	1.37	
6,037.0	7.80	67.80	5,441.4	857.0	2,284.5	2,439.9	3.21	-3.16	-3.68	
6,131.0	6.80	69.80	5,534.6	861.3	2,295.6	2,451.8	1.10	-1.06	2.13	
6,226.0	6.20	71.80	5,629.0	864.8	2,305.8	2,462.5	0.67	-0.63	2.11	
6,321.0	4.10	70.30	5,723.6	867.6	2,313.8	2,471.1	2.21	-2.21	-1.58	
6,415.0	3.20	72.90	5,817.4	869.5	2,319.5	2,477.1	0.97	-0.96	2.77	
6,510.0	2.30	47.00	5,912.3	871.6	2,323.4	2,481.5	1.59	-0.95	-27.26	
6,604.0	1.90	36.90	6,006.3	874.1	2,325.8	2,484.5	0.58	-0.43	-10.74	
6,699.0	1.60	22.30	6,101.2	876.6	2,327.2	2,486.7	0.56	-0.32	-15.37	
6,794.0	1.10	28.70	6,196.2	878.6	2,328.1	2,488.3	0.55	-0.53	6.74	
6,888.0	1.00	24.50	6,290.2	880.2	2,328.9	2,489.6	0.13	-0.11	-4.47	
6,983.0	0.60	16.20	6,385.2	881.4	2,329.4	2,490.4	0.44	-0.42	-8.74	
7,077.0	0.40	14.10	6,479.2	882.2	2,329.6	2,490.9	0.21	-0.21	-2.23	
7,172.0	0.10	156.10	6,574.2	882.4	2,329.7	2,491.1	0.51	-0.32	149.47	
7,266.0	0.30	136.50	6,668.2	882.2	2,329.9	2,491.2	0.22	0.21	-20.85	
7,361.0	0.10	193.20	6,763.2	881.9	2,330.1	2,491.3	0.27	-0.21	59.68	
7,455.0	0.70	258.80	6,857.2	881.7	2,329.5	2,490.6	0.71	0.64	69.79	
7,550.0	1.50	253.30	6,952.2	881.2	2,327.7	2,488.8	0.85	0.84	-5.79	
7,644.0	1.20	265.80	7,046.1	880.8	2,325.6	2,486.7	0.45	-0.32	13.30	
7,739.0	2.20	267.40	7,141.1	880.7	2,322.8	2,484.0	1.05	1.05	1.68	
7,834.0	2.40	251.30	7,236.0	879.9	2,319.1	2,480.2	0.71	0.21	-16.95	
7,928.0	2.40	242.80	7,329.9	878.4	2,315.4	2,476.3	0.38	0.00	-9.04	
8,023.0	2.40	241.30	7,424.8	876.5	2,311.9	2,472.4	0.07	0.00	-1.58	
8,118.0	2.50	249.30	7,519.8	874.9	2,308.3	2,468.3	0.37	0.11	8.42	
8,158.0	2.10	247.80	7,559.7	874.3	2,306.8	2,466.7	1.01	-1.00	-3.75	
Projection to TD @ 8214.0' MD / 7615.7' TVD										
8,214.0	2.10	247.80	7,615.7	873.5	2,304.9	2,464.7	0.00	0.00	0.00	

Design Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates			
		+N/-S (usft)	+E/-W (usft)	Comment	
294.0	293.9	1.7	4.6	First MWD Survey @ 294.0' MD / 293.9' TVD	
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