



Laramie Energy, LLC

Mesa County, CO

Bruton 19-06 Pad

Bruton Federal 19-09E

Wellbore #1

Design: Wellbore #1

QES Survey Report

15 October, 2017





Survey Report



Company:	Laramie Energy, LLC	Local Co-ordinate Reference:	Well Bruton Federal 19-09E
Project:	Mesa County, CO	TVD Reference:	well @ 7286.0usft (H&P #290)
Site:	Bruton 19-06 Pad	MD Reference:	well @ 7286.0usft (H&P #290)
Well:	Bruton Federal 19-09E	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	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 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 19-09E					
Well Position	+N/-S	0.0 usft	Northing:	1,528,980.13 usft	Latitude:	39.262856
	+E/-W	0.0 usft	Easting:	2,344,606.63 usft	Longitude:	-107.815022
Position Uncertainty		0.0 usft	Wellhead Elevation:	0.0 usft	Ground Level:	7,262.0 usft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	10/3/2017	9.56	65.42	51,383.14226913

Design	Wellbore #1				
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	81.13	

Survey Program	Date	10/15/2017			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
245.0	8,230.0	QES MWD Surveys (Wellbore #1)	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 @ 245.0' MD / 245.0' TVD									
245.0	1.20	96.00	245.0	-0.3	2.6	2.5	0.49	0.49	0.00
385.0	3.20	67.20	384.9	1.1	7.6	7.7	1.59	1.43	-20.57
566.0	8.80	88.90	564.8	3.3	26.1	26.3	3.28	3.09	11.99
657.0	12.00	84.40	654.3	4.4	42.5	42.7	3.63	3.52	-4.95
748.0	15.60	88.20	742.7	5.7	64.2	64.3	4.08	3.96	4.18
839.0	18.70	85.70	829.6	7.2	90.9	91.0	3.50	3.41	-2.75
929.0	21.70	83.30	914.1	10.2	121.9	122.0	3.46	3.33	-2.67
1,024.0	24.50	79.60	1,001.5	15.8	158.7	159.2	3.32	2.95	-3.89
1,119.0	27.20	76.00	1,087.0	24.6	199.1	200.6	3.29	2.84	-3.79



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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)
1,214.0	31.00	77.10	1,170.0	35.3	244.1	246.6	4.04	4.00	1.16
1,308.0	30.80	80.20	1,250.6	44.8	291.4	294.8	1.71	-0.21	3.30
1,403.0	30.90	79.30	1,332.2	53.5	339.3	343.5	0.50	0.11	-0.95
1,498.0	29.80	79.90	1,414.2	62.2	386.5	391.5	1.20	-1.16	0.63
1,626.0	29.00	80.20	1,525.7	73.0	448.4	454.3	0.64	-0.63	0.23
1,721.0	31.40	81.20	1,607.8	80.7	495.6	502.1	2.58	2.53	1.05
1,816.0	31.10	81.70	1,689.0	88.1	544.3	551.4	0.42	-0.32	0.53
1,910.0	30.60	81.50	1,769.7	95.1	592.0	599.6	0.54	-0.53	-0.21
2,005.0	29.80	81.40	1,851.8	102.2	639.3	647.4	0.84	-0.84	-0.11
2,100.0	28.80	80.50	1,934.6	109.5	685.2	693.9	1.15	-1.05	-0.95
2,194.0	30.40	80.50	2,016.4	117.2	731.0	740.3	1.70	1.70	0.00
2,289.0	29.40	79.30	2,098.7	125.5	777.6	787.6	1.23	-1.05	-1.26
2,383.0	29.70	87.30	2,180.5	130.8	823.5	833.9	4.21	0.32	8.51
2,478.0	28.30	86.20	2,263.6	133.4	869.5	879.7	1.58	-1.47	-1.16
2,573.0	27.40	85.30	2,347.6	136.7	913.8	923.9	1.05	-0.95	-0.95
2,667.0	28.30	83.10	2,430.7	141.2	957.4	967.8	1.45	0.96	-2.34
2,762.0	26.80	82.10	2,514.9	146.8	1,001.0	1,011.7	1.65	-1.58	-1.05
2,856.0	28.60	80.00	2,598.2	153.7	1,044.2	1,055.4	2.18	1.91	-2.23
2,951.0	32.00	76.30	2,680.2	163.6	1,091.0	1,103.2	4.08	3.58	-3.89
3,045.0	31.20	76.80	2,760.3	175.0	1,138.9	1,152.3	0.90	-0.85	0.53
3,140.0	30.30	76.10	2,841.9	186.4	1,186.2	1,200.7	1.02	-0.95	-0.74
3,234.0	31.00	80.50	2,922.8	196.1	1,233.1	1,248.5	2.50	0.74	4.68
3,329.0	30.00	80.70	3,004.6	204.0	1,280.6	1,296.8	1.06	-1.05	0.21
3,424.0	29.20	79.80	3,087.2	211.9	1,326.9	1,343.7	0.96	-0.84	-0.95
3,518.0	28.20	79.40	3,169.7	220.1	1,371.3	1,388.8	1.08	-1.06	-0.43
3,613.0	27.50	79.30	3,253.7	228.3	1,414.9	1,433.2	0.74	-0.74	-0.11
3,708.0	30.30	79.40	3,336.8	236.7	1,460.0	1,479.0	2.95	2.95	0.11
3,802.0	29.20	79.60	3,418.4	245.2	1,505.9	1,525.7	1.17	-1.17	0.21
3,897.0	28.40	79.30	3,501.7	253.6	1,550.9	1,571.4	0.86	-0.84	-0.32
3,992.0	29.00	83.20	3,585.0	260.5	1,595.9	1,617.0	2.07	0.63	4.11
4,086.0	28.50	83.00	3,667.4	266.0	1,640.8	1,662.2	0.54	-0.53	-0.21
4,181.0	28.30	82.60	3,751.0	271.6	1,685.6	1,707.4	0.29	-0.21	-0.42
4,276.0	27.60	83.10	3,834.9	277.2	1,729.8	1,751.9	0.78	-0.74	0.53
4,370.0	28.50	82.70	3,917.9	282.6	1,773.7	1,796.1	0.98	0.96	-0.43
4,465.0	27.60	83.90	4,001.7	287.9	1,818.0	1,840.7	1.12	-0.95	1.26
4,559.0	28.50	81.10	4,084.7	293.6	1,861.9	1,884.9	1.70	0.96	-2.98
4,654.0	27.50	81.60	4,168.6	300.4	1,906.0	1,929.5	1.08	-1.05	0.53
4,748.0	28.00	78.60	4,251.8	307.9	1,949.1	1,973.2	1.58	0.53	-3.19
4,843.0	28.80	79.60	4,335.3	316.4	1,993.4	2,018.4	0.98	0.84	1.05
4,937.0	27.30	79.00	4,418.3	324.6	2,036.9	2,062.6	1.62	-1.60	-0.64
5,032.0	26.60	79.10	4,503.0	332.8	2,079.1	2,105.6	0.74	-0.74	0.11
5,126.0	26.20	79.00	4,587.2	340.7	2,120.2	2,147.3	0.43	-0.43	-0.11
5,221.0	24.10	80.50	4,673.2	348.0	2,159.9	2,187.7	2.31	-2.21	1.58



Survey Report



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Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
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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)	
5,315.0	23.20	81.50	4,759.3	353.9	2,197.1	2,225.4	1.05	-0.96	1.06	
5,410.0	22.50	80.70	4,846.8	359.6	2,233.6	2,262.3	0.81	-0.74	-0.84	
5,505.0	20.50	80.00	4,935.2	365.4	2,267.9	2,297.1	2.12	-2.11	-0.74	
5,599.0	18.50	78.30	5,023.8	371.3	2,298.7	2,328.5	2.21	-2.13	-1.81	
5,694.0	16.90	78.00	5,114.3	377.2	2,327.0	2,357.3	1.69	-1.68	-0.32	
5,789.0	15.20	76.40	5,205.6	383.0	2,352.6	2,383.5	1.85	-1.79	-1.68	
5,883.0	13.80	79.80	5,296.6	387.9	2,375.6	2,407.0	1.74	-1.49	3.62	
5,978.0	12.30	78.40	5,389.1	391.9	2,396.7	2,428.4	1.61	-1.58	-1.47	
6,072.0	10.80	76.60	5,481.2	396.0	2,415.0	2,447.2	1.64	-1.60	-1.91	
6,167.0	8.30	84.80	5,574.9	398.7	2,430.5	2,462.9	2.99	-2.63	8.63	
6,261.0	6.90	85.60	5,668.1	399.7	2,442.9	2,475.3	1.49	-1.49	0.85	
6,356.0	4.40	81.00	5,762.6	400.7	2,452.2	2,484.7	2.67	-2.63	-4.84	
6,450.0	1.60	94.20	5,856.5	401.2	2,457.1	2,489.6	3.05	-2.98	14.04	
6,545.0	0.80	212.20	5,951.5	400.5	2,458.1	2,490.4	2.21	-0.84	124.21	
6,640.0	0.80	211.40	6,046.5	399.4	2,457.4	2,489.5	0.01	0.00	-0.84	
6,734.0	0.90	210.80	6,140.4	398.2	2,456.6	2,488.7	0.11	0.11	-0.64	
6,829.0	0.60	204.10	6,235.4	397.1	2,456.0	2,487.9	0.33	-0.32	-7.05	
6,923.0	0.70	182.10	6,329.4	396.1	2,455.8	2,487.5	0.28	0.11	-23.40	
7,018.0	0.70	199.10	6,424.4	395.0	2,455.6	2,487.1	0.22	0.00	17.89	
7,113.0	0.70	204.20	6,519.4	393.9	2,455.2	2,486.6	0.07	0.00	5.37	
7,207.0	1.20	231.30	6,613.4	392.7	2,454.2	2,485.4	0.70	0.53	28.83	
7,302.0	1.10	235.60	6,708.4	391.6	2,452.7	2,483.7	0.14	-0.11	4.53	
7,396.0	1.70	230.90	6,802.4	390.2	2,450.8	2,481.7	0.65	0.64	-5.00	
7,491.0	1.80	238.20	6,897.3	388.5	2,448.5	2,479.1	0.26	0.11	7.68	
7,585.0	2.70	233.90	6,991.2	386.5	2,445.4	2,475.8	0.97	0.96	-4.57	
7,680.0	3.10	229.00	7,086.1	383.5	2,441.7	2,471.6	0.49	0.42	-5.16	
7,775.0	3.30	233.50	7,181.0	380.1	2,437.5	2,467.0	0.34	0.21	4.74	
7,869.0	3.20	228.40	7,274.8	376.8	2,433.4	2,462.4	0.33	-0.11	-5.43	
7,964.0	3.60	226.40	7,369.6	373.0	2,429.3	2,457.7	0.44	0.42	-2.11	
8,058.0	3.50	230.00	7,463.5	369.1	2,424.9	2,452.8	0.26	-0.11	3.83	
8,153.0	3.30	229.20	7,558.3	365.4	2,420.6	2,448.0	0.22	-0.21	-0.84	
8,174.0	3.00	226.80	7,579.3	364.7	2,419.8	2,447.1	1.56	-1.43	-11.43	
Projection to TD @ 8230.0' MD / 7635.2' TVD										
8,230.0	3.00	226.80	7,635.2	362.7	2,417.6	2,444.6	0.00	0.00	0.00	

Design Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment	
		+N/-S (usft)	+E/-W (usft)		
245.0	245.0	-0.3	2.6	First MWD Survey @ 245.0' MD / 245.0' TVD	
8,230.0	7,635.2	362.7	2,417.6	Projection to TD @ 8230.0' MD / 7635.2' TVD	



Survey Report



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