



Laramie Energy, LLC

Mesa County, CO

Bruton 19-06 Pad

Bruton 19-04W

Wellbore #1

Design: Wellbore #1

QES Survey Report

08 September, 2017





Survey Report



Company:	Laramie Energy, LLC	Local Co-ordinate Reference:	Well Bruton 19-04W
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 19-04W	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 19-04W					
Well Position	+N/-S	0.0 usft	Northing:	1,529,015.91 usft	Latitude:	39.262953
	+E/-W	0.0 usft	Easting:	2,344,592.59 usft	Longitude:	-107.815075
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	8/30/2017	9.57	65.42	51,393.53592454

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	349.02	

Survey Program		Date	9/8/2017		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
295.0	7,878.0	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 @ 295.0' MD / 294.9' TVD									
295.0	3.10	300.00	294.9	4.0	-6.9	5.2	1.05	1.05	0.00
386.0	5.10	312.90	385.6	8.0	-12.0	10.1	2.41	2.20	14.18
476.0	6.50	347.60	475.2	15.7	-16.0	18.4	4.11	1.56	38.56
567.0	10.10	356.70	565.2	28.7	-17.6	31.5	4.20	3.96	10.00
657.0	13.60	355.60	653.3	47.1	-18.9	49.8	3.90	3.89	-1.22
749.0	17.20	351.20	742.0	71.3	-21.8	74.2	4.11	3.91	-4.78
839.0	18.90	347.90	827.5	98.8	-26.9	102.1	2.20	1.89	-3.67
930.0	18.50	348.30	913.7	127.3	-32.9	131.2	0.46	-0.44	0.44
1,025.0	17.80	348.70	1,004.0	156.3	-38.8	160.8	0.75	-0.74	0.42



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Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	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)
1,119.0	17.10	346.90	1,093.7	183.8	-44.7	189.0	0.94	-0.74	-1.91
1,214.0	18.10	349.80	1,184.2	212.0	-50.5	217.7	1.40	1.05	3.05
1,309.0	17.40	348.10	1,274.7	240.4	-56.1	246.7	0.92	-0.74	-1.79
1,404.0	18.60	350.20	1,365.1	269.2	-61.6	276.0	1.44	1.26	2.21
1,498.0	19.60	351.30	1,453.9	299.6	-66.5	306.8	1.13	1.06	1.17
1,589.0	19.50	352.40	1,539.6	329.7	-70.8	337.2	0.42	-0.11	1.21
1,683.0	18.80	350.40	1,628.4	360.2	-75.4	368.0	1.02	-0.74	-2.13
1,778.0	18.10	351.70	1,718.6	389.9	-80.1	398.0	0.85	-0.74	1.37
1,873.0	17.20	349.80	1,809.1	418.3	-84.7	426.8	1.12	-0.95	-2.00
1,967.0	18.30	351.10	1,898.6	446.6	-89.5	455.5	1.24	1.17	1.38
2,062.0	19.80	350.80	1,988.4	477.2	-94.3	486.5	1.58	1.58	-0.32
2,157.0	18.90	350.80	2,078.0	508.3	-99.4	517.9	0.95	-0.95	0.00
2,251.0	17.80	349.80	2,167.3	537.5	-104.4	547.5	1.22	-1.17	-1.06
2,346.0	19.40	350.00	2,257.3	567.3	-109.7	577.8	1.69	1.68	0.21
2,440.0	18.60	349.60	2,346.2	597.4	-115.1	608.4	0.86	-0.85	-0.43
2,535.0	17.80	350.00	2,436.4	626.6	-120.3	638.1	0.85	-0.84	0.42
2,630.0	19.00	349.40	2,526.6	656.1	-125.7	668.0	1.28	1.26	-0.63
2,725.0	18.10	347.10	2,616.6	685.7	-131.8	698.3	1.22	-0.95	-2.42
2,819.0	20.30	349.10	2,705.4	716.0	-138.2	729.2	2.44	2.34	2.13
2,914.0	19.30	349.10	2,794.8	747.6	-144.3	761.3	1.05	-1.05	0.00
3,008.0	19.10	349.00	2,883.5	777.9	-150.1	792.3	0.22	-0.21	-0.11
3,103.0	18.60	347.90	2,973.5	808.0	-156.3	822.9	0.65	-0.53	-1.16
3,198.0	18.20	348.00	3,063.6	837.3	-162.5	852.9	0.42	-0.42	0.11
3,292.0	17.70	348.50	3,153.0	865.7	-168.4	881.9	0.56	-0.53	0.53
3,387.0	19.10	350.10	3,243.2	895.1	-174.0	911.9	1.57	1.47	1.68
3,481.0	18.60	349.20	3,332.1	925.0	-179.5	942.2	0.62	-0.53	-0.96
3,576.0	18.00	347.60	3,422.3	954.2	-185.4	972.1	0.82	-0.63	-1.68
3,671.0	19.00	351.30	3,512.4	983.8	-190.9	1,002.2	1.62	1.05	3.89
3,765.0	18.20	350.90	3,601.5	1,013.5	-195.6	1,032.2	0.86	-0.85	-0.43
3,860.0	20.00	351.90	3,691.3	1,044.2	-200.2	1,063.2	1.93	1.89	1.05
3,954.0	19.90	352.00	3,779.6	1,076.0	-204.7	1,095.2	0.11	-0.11	0.11
4,049.0	19.20	346.10	3,869.2	1,107.1	-210.7	1,127.0	2.20	-0.74	-6.21
4,143.0	18.40	345.10	3,958.1	1,136.5	-218.2	1,157.2	0.92	-0.85	-1.06
4,238.0	18.40	348.20	4,048.3	1,165.6	-225.2	1,187.2	1.03	0.00	3.26
4,333.0	17.60	346.80	4,138.6	1,194.3	-231.5	1,216.5	0.96	-0.84	-1.47
4,427.0	18.10	349.10	4,228.1	1,222.5	-237.5	1,245.3	0.92	0.53	2.45
4,522.0	17.60	348.80	4,318.5	1,251.1	-243.1	1,274.5	0.54	-0.53	-0.32
4,616.0	18.40	347.90	4,407.9	1,279.5	-249.0	1,303.5	0.90	0.85	-0.96
4,711.0	20.80	349.70	4,497.4	1,310.8	-255.1	1,335.4	2.60	2.53	1.89
4,806.0	19.80	349.80	4,586.5	1,343.2	-261.0	1,368.3	1.05	-1.05	0.11
4,901.0	18.00	349.40	4,676.4	1,373.5	-266.5	1,399.1	1.90	-1.89	-0.42
4,995.0	16.50	348.60	4,766.2	1,400.8	-271.8	1,427.0	1.62	-1.60	-0.85
5,090.0	17.00	349.80	4,857.1	1,427.7	-277.0	1,454.3	0.64	0.53	1.26



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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)	
5,184.0	15.60	348.40	4,947.4	1,453.6	-281.9	1,480.7	1.55	-1.49	-1.49	
5,279.0	14.50	345.80	5,039.1	1,477.7	-287.4	1,505.4	1.36	-1.16	-2.74	
5,373.0	12.70	349.10	5,130.5	1,499.2	-292.3	1,527.4	2.08	-1.91	3.51	
5,468.0	10.90	353.70	5,223.5	1,518.4	-295.2	1,546.8	2.14	-1.89	4.84	
5,562.0	8.30	350.70	5,316.1	1,533.9	-297.3	1,562.5	2.82	-2.77	-3.19	
5,657.0	7.70	2.20	5,410.2	1,547.1	-298.2	1,575.5	1.80	-0.63	12.11	
5,751.0	7.20	0.80	5,503.4	1,559.3	-297.8	1,587.4	0.57	-0.53	-1.49	
5,846.0	5.70	10.90	5,597.8	1,569.8	-296.9	1,597.6	1.97	-1.58	10.63	
5,941.0	5.20	8.10	5,692.4	1,578.7	-295.4	1,606.1	0.60	-0.53	-2.95	
6,035.0	4.40	8.50	5,786.1	1,586.5	-294.2	1,613.5	0.85	-0.85	0.43	
6,129.0	3.40	4.60	5,879.8	1,592.9	-293.5	1,619.6	1.10	-1.06	-4.15	
6,224.0	2.90	355.20	5,974.7	1,598.1	-293.5	1,624.7	0.76	-0.53	-9.89	
6,319.0	2.80	359.10	6,069.6	1,602.8	-293.7	1,629.4	0.23	-0.11	4.11	
6,414.0	1.70	7.90	6,164.5	1,606.5	-293.5	1,633.0	1.21	-1.16	9.26	
6,508.0	1.30	357.00	6,258.5	1,608.9	-293.4	1,635.4	0.52	-0.43	-11.60	
6,603.0	1.00	341.80	6,353.4	1,610.8	-293.7	1,637.3	0.45	-0.32	-16.00	
6,697.0	0.70	338.70	6,447.4	1,612.1	-294.2	1,638.6	0.32	-0.32	-3.30	
6,792.0	0.20	151.20	6,542.4	1,612.5	-294.3	1,639.1	0.95	-0.53	181.58	
6,886.0	0.30	209.00	6,636.4	1,612.2	-294.3	1,638.7	0.27	0.11	61.49	
6,981.0	0.70	226.60	6,731.4	1,611.5	-294.9	1,638.2	0.45	0.42	18.53	
7,076.0	1.20	239.10	6,826.4	1,610.6	-296.2	1,637.6	0.57	0.53	13.16	
7,170.0	1.40	213.00	6,920.4	1,609.2	-297.6	1,636.4	0.66	0.21	-27.77	
7,265.0	1.30	204.50	7,015.4	1,607.2	-298.7	1,634.7	0.24	-0.11	-8.95	
7,359.0	1.60	183.10	7,109.3	1,604.9	-299.2	1,632.5	0.65	0.32	-22.77	
7,454.0	2.40	204.10	7,204.3	1,601.8	-300.1	1,629.6	1.13	0.84	22.11	
7,548.0	2.80	207.10	7,298.2	1,597.9	-302.0	1,626.2	0.45	0.43	3.19	
7,611.0	2.90	210.50	7,361.1	1,595.2	-303.5	1,623.8	0.31	0.16	5.40	
7,738.0	2.80	213.40	7,487.9	1,589.8	-306.8	1,619.2	0.14	-0.08	2.28	
7,822.0	2.80	214.50	7,571.8	1,586.4	-309.1	1,616.3	0.06	0.00	1.31	
Projection to TD @ 7878.0' MD / 7627.8' TVD										
7,878.0	2.80	214.50	7,627.8	1,584.2	-310.7	1,614.4	0.00	0.00	0.00	

Design Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment	
		+N/-S (usft)	+E/-W (usft)		
295.0	294.9	4.0	-6.9	First MWD Survey @ 295.0' MD / 294.9' TVD	
7,878.0	7,627.8	1,584.2	-310.7	Projection to TD @ 7878.0' MD / 7627.8' TVD	