



Laramie Energy, LLC

Mesa County, CO

Bruton 30-10 Pad

Bruton 30-14E

B-8

Design: B-8

QES Survey Report

14 December, 2017





Survey Report



Company:	Laramie Energy, LLC	Local Co-ordinate Reference:	Well Bruton 30-14E
Project:	Mesa County, CO	TVD Reference:	well @ 7673.0usft (H&P #522)
Site:	Bruton 30-10 Pad	MD Reference:	well @ 7673.0usft (H&P #522)
Well:	Bruton 30-14E	North Reference:	True
Wellbore:	B-8	Survey Calculation Method:	Minimum Curvature
Design:	B-8	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 30-10 Pad				
Site Position:		Northing:	1,523,424.58 usft	Latitude:	39.247725
From:	Map	Easting:	2,346,291.81 usft	Longitude:	-107.808574
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	-1.46 °

Well	Bruton 30-14E					
Well Position	+N/-S	0.0 usft	Northing:	1,523,595.99 usft	Latitude:	39.248189
	+E/-W	0.0 usft	Easting:	2,346,201.47 usft	Longitude:	-107.808908
Position Uncertainty		0.0 usft	Wellhead Elevation:	0.0 usft	Ground Level:	7,643.0 usft

Wellbore	B-8				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	11/22/2017	9.54	65.41	51,357.74884345

Design	B-8				
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	145.84	

Survey Program	Date	12/14/2017			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
110.0	7,897.0	QES MWD Surveys (B-8)	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 @ 110.0' MD / 110.0' TVD									
110.0	1.20	107.70	110.0	-0.4	1.1	0.9	1.09	1.09	0.00
201.0	1.40	77.50	201.0	-0.4	3.1	2.1	0.77	0.22	-33.19
292.0	1.40	71.50	291.9	0.2	5.2	2.8	0.16	0.00	-6.59
383.0	1.30	79.90	382.9	0.7	7.3	3.5	0.24	-0.11	9.23
475.0	1.80	91.50	474.9	0.9	9.8	4.8	0.64	0.54	12.61
566.0	1.50	92.30	565.8	0.8	12.4	6.3	0.33	-0.33	0.88
657.0	1.60	97.90	656.8	0.6	14.8	7.9	0.20	0.11	6.15
748.0	2.10	96.00	747.8	0.2	17.8	9.8	0.55	0.55	-2.09
839.0	1.40	76.30	838.7	0.3	20.5	11.3	1.00	-0.77	-21.65



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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)
930.0	1.10	78.80	929.7	0.7	22.4	12.0	0.33	-0.33	2.75
1,021.0	1.10	20.70	1,020.7	1.7	23.6	11.8	1.17	0.00	-63.85
1,116.0	0.50	338.60	1,115.7	3.0	23.8	10.9	0.84	-0.63	-44.32
1,210.0	0.60	307.70	1,209.7	3.6	23.2	10.0	0.33	0.11	-32.87
1,304.0	1.00	302.30	1,303.7	4.4	22.1	8.8	0.43	0.43	-5.74
1,398.0	1.00	307.10	1,397.6	5.3	20.8	7.3	0.09	0.00	5.11
1,492.0	1.00	326.40	1,491.6	6.5	19.7	5.7	0.36	0.00	20.53
1,588.0	1.40	318.70	1,587.6	8.1	18.5	3.7	0.45	0.42	-8.02
1,682.0	0.70	168.40	1,681.6	8.4	17.8	3.1	2.17	-0.74	-159.89
1,776.0	0.90	207.90	1,775.6	7.2	17.6	3.9	0.61	0.21	42.02
1,870.0	1.40	208.20	1,869.6	5.5	16.7	4.8	0.53	0.53	0.32
1,964.0	1.30	219.70	1,963.6	3.7	15.5	5.7	0.31	-0.11	12.23
2,059.0	1.40	194.50	2,058.5	1.7	14.5	6.7	0.63	0.11	-26.53
2,153.0	1.50	186.30	2,152.5	-0.6	14.1	8.4	0.24	0.11	-8.72
2,247.0	1.20	204.70	2,246.5	-2.7	13.5	9.9	0.56	-0.32	19.57
2,341.0	2.70	181.00	2,340.4	-5.8	13.1	12.2	1.78	1.60	-25.21
2,435.0	4.80	164.10	2,434.2	-11.8	14.1	17.7	2.50	2.23	-17.98
2,529.0	5.20	157.50	2,527.9	-19.6	16.8	25.6	0.74	0.43	-7.02
2,623.0	7.30	150.30	2,621.3	-28.7	21.4	35.8	2.38	2.23	-7.66
2,718.0	11.00	152.20	2,715.1	-42.0	28.6	50.8	3.91	3.89	2.00
2,812.0	12.30	144.50	2,807.1	-58.0	38.6	69.7	2.15	1.38	-8.19
2,906.0	14.90	141.60	2,898.5	-75.7	51.9	91.8	2.86	2.77	-3.09
3,000.0	18.50	137.30	2,988.5	-96.1	69.6	118.6	4.05	3.83	-4.57
3,095.0	20.10	138.60	3,078.2	-119.4	90.6	149.7	1.74	1.68	1.37
3,189.0	20.30	136.60	3,166.4	-143.4	112.5	181.8	0.76	0.21	-2.13
3,283.0	19.80	137.60	3,254.7	-167.0	134.4	213.7	0.64	-0.53	1.06
3,378.0	19.10	140.50	3,344.3	-190.9	155.2	245.1	1.26	-0.74	3.05
3,472.0	19.10	140.50	3,433.1	-214.6	174.7	275.7	0.00	0.00	0.00
3,566.0	19.80	143.00	3,521.7	-239.2	194.1	306.9	1.16	0.74	2.66
3,660.0	19.30	144.70	3,610.3	-264.6	212.6	338.3	0.81	-0.53	1.81
3,754.0	20.20	144.00	3,698.8	-290.4	231.2	370.1	0.99	0.96	-0.74
3,849.0	20.10	147.10	3,788.0	-317.4	249.7	402.8	1.13	-0.11	3.26
3,943.0	20.40	145.90	3,876.2	-344.5	267.6	435.3	0.55	0.32	-1.28
4,037.0	20.20	145.00	3,964.3	-371.4	286.1	467.9	0.39	-0.21	-0.96
4,131.0	19.30	145.80	4,052.8	-397.5	304.2	499.7	1.00	-0.96	0.85
4,226.0	19.50	148.90	4,142.4	-424.1	321.2	531.2	1.10	0.21	3.26
4,320.0	20.70	150.70	4,230.7	-452.0	337.4	563.5	1.44	1.28	1.91
4,414.0	20.80	148.30	4,318.6	-480.7	354.3	596.7	0.91	0.11	-2.55
4,508.0	19.70	149.40	4,406.8	-508.5	371.1	629.2	1.24	-1.17	1.17
4,603.0	18.60	150.10	4,496.5	-535.4	386.8	660.3	1.18	-1.16	0.74
4,697.0	20.10	147.40	4,585.2	-562.0	403.0	691.4	1.86	1.60	-2.87
4,791.0	19.30	145.60	4,673.7	-588.5	420.5	723.0	1.07	-0.85	-1.91
4,886.0	18.30	146.90	4,763.6	-613.9	437.5	753.7	1.14	-1.05	1.37



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Design:	B-8	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)	
4,980.0	18.00	149.10	4,853.0	-638.7	453.0	782.9	0.80	-0.32	2.34	
5,074.0	17.00	147.80	4,942.6	-662.8	467.8	811.1	1.14	-1.06	-1.38	
5,168.0	14.00	145.50	5,033.2	-683.8	481.6	836.3	3.26	-3.19	-2.45	
5,263.0	12.80	145.20	5,125.6	-701.9	494.1	858.3	1.27	-1.26	-0.32	
5,357.0	10.30	146.40	5,217.7	-717.5	504.7	877.1	2.67	-2.66	1.28	
5,451.0	9.80	145.30	5,310.2	-731.1	513.9	893.5	0.57	-0.53	-1.17	
5,545.0	7.90	145.10	5,403.1	-742.9	522.1	908.0	2.02	-2.02	-0.21	
5,639.0	5.00	145.40	5,496.5	-751.6	528.2	918.5	3.09	-3.09	0.32	
5,734.0	4.10	145.30	5,591.2	-757.8	532.5	926.0	0.95	-0.95	-0.11	
5,828.0	2.30	157.60	5,685.1	-762.3	535.1	931.3	2.04	-1.91	13.09	
5,922.0	2.70	160.90	5,779.0	-766.2	536.5	935.2	0.45	0.43	3.51	
6,016.0	1.20	171.80	5,872.9	-769.2	537.4	938.3	1.64	-1.60	11.60	
6,111.0	1.80	167.90	5,967.9	-771.7	537.9	940.5	0.64	0.63	-4.11	
6,205.0	1.60	153.30	6,061.8	-774.3	538.8	943.2	0.51	-0.21	-15.53	
6,299.0	1.60	147.10	6,155.8	-776.6	540.1	945.8	0.18	0.00	-6.60	
6,393.0	1.50	190.50	6,249.8	-778.9	540.5	948.0	1.22	-0.11	46.17	
6,487.0	1.80	201.30	6,343.7	-781.5	539.8	949.7	0.46	0.32	11.49	
6,582.0	0.80	230.10	6,438.7	-783.3	538.7	950.6	1.23	-1.05	30.32	
6,676.0	0.70	250.60	6,532.7	-783.9	537.7	950.6	0.30	-0.11	21.81	
6,770.0	0.80	227.50	6,626.7	-784.5	536.7	950.5	0.34	0.11	-24.57	
6,864.0	1.60	233.30	6,720.7	-785.7	535.1	950.7	0.86	0.85	6.17	
6,958.0	1.40	235.20	6,814.6	-787.2	533.1	950.7	0.22	-0.21	2.02	
7,052.0	1.60	237.80	6,908.6	-788.5	531.1	950.7	0.22	0.21	2.77	
7,147.0	1.70	242.00	7,003.6	-789.9	528.7	950.5	0.17	0.11	4.42	
7,241.0	1.80	213.80	7,097.5	-791.8	526.7	950.9	0.91	0.11	-30.00	
7,335.0	1.85	225.49	7,191.5	-794.1	524.8	951.7	0.40	0.05	12.44	
7,429.0	2.07	206.24	7,285.4	-796.7	522.9	952.8	0.73	0.23	-20.48	
7,523.0	1.93	208.52	7,379.4	-799.6	521.4	954.4	0.17	-0.15	2.43	
7,617.0	1.98	229.44	7,473.3	-802.0	519.4	955.3	0.76	0.05	22.26	
7,711.0	2.59	233.05	7,567.2	-804.4	516.5	955.6	0.67	0.65	3.84	
7,806.0	2.50	230.60	7,662.1	-807.0	513.2	955.9	0.15	-0.09	-2.58	
7,837.0	2.50	235.20	7,693.1	-807.8	512.1	956.0	0.65	0.00	14.84	
Projection to TD @ 7897.0' MD / 7753.1' TVD										
7,897.0	2.50	235.20	7,753.1	-809.3	510.0	956.0	0.00	0.00	0.00	

Design Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates			
		+N/-S (usft)	+E/-W (usft)	Comment	
110.0	110.0	-0.4	1.1	First MWD Survey @ 110.0' MD / 110.0' TVD	
7,897.0	7,753.1	-809.3	510.0	Projection to TD @ 7897.0' MD / 7753.1' TVD	



Survey Report



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Checked By: _____	Approved By: _____	Date: _____
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