



Laramie Energy, LLC

Mesa County, CO

Bruton 30-10 Pad

Bruton 30-15E

B-7

Design: B-7

QES Survey Report

18 December, 2017





Survey Report



Company:	Laramie Energy, LLC	Local Co-ordinate Reference:	Well Bruton 30-15E
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 30-15E	North Reference:	True
Wellbore:	B-7	Survey Calculation Method:	Minimum Curvature
Design:	B-7	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 30-15E					
Well Position	+N/-S	0.0 usft	Northing:	1,523,587.86 usft	Latitude:	39.248167
	+E/-W	0.0 usft	Easting:	2,346,205.80 usft	Longitude:	-107.808892
Position Uncertainty		0.0 usft	Wellhead Elevation:	0.0 usft	Ground Level:	7,643.0 usft

Wellbore	B-7				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	11/22/2017	9.54	65.41	51,357.73898138

Design	B-7				
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	335.08	

Survey Program	Date	12/18/2017			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
110.0	7,873.0	QES MWD Surveys (B-7)	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	0.30	196.30	110.0	-0.3	-0.1	-0.2	0.27	0.27	0.00	
201.0	0.40	177.40	201.0	-0.8	-0.1	-0.7	0.17	0.11	-20.77	
292.0	0.40	159.30	292.0	-1.4	0.0	-1.3	0.14	0.00	-19.89	
383.0	0.90	177.10	383.0	-2.4	0.1	-2.3	0.59	0.55	19.56	
475.0	0.70	50.10	475.0	-2.8	0.6	-2.8	1.56	-0.22	-138.04	
566.0	1.20	15.20	566.0	-1.5	1.3	-1.9	0.82	0.55	-38.35	
657.0	1.30	33.00	657.0	0.3	2.1	-0.7	0.44	0.11	19.56	
748.0	2.10	348.10	747.9	2.7	2.3	1.5	1.64	0.88	-49.34	
839.0	2.00	348.70	838.9	5.9	1.7	4.7	0.11	-0.11	0.66	



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Wellbore:	B-7	Survey Calculation Method:	Minimum Curvature
Design:	B-7	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)
930.0	2.30	281.00	929.8	7.8	-0.4	7.3	2.65	0.33	-74.40
1,021.0	1.80	240.60	1,020.8	7.5	-3.5	8.3	1.64	-0.55	-44.40
1,116.0	0.80	139.20	1,115.7	6.3	-4.3	7.5	2.22	-1.05	-106.74
1,210.0	1.50	139.40	1,209.7	4.8	-3.1	5.7	0.74	0.74	0.21
1,304.0	4.00	156.30	1,303.6	0.9	-1.0	1.2	2.77	2.66	17.98
1,398.0	7.10	164.10	1,397.1	-7.7	1.9	-7.8	3.39	3.30	8.30
1,492.0	11.10	167.20	1,489.9	-22.1	5.5	-22.4	4.29	4.26	3.30
1,588.0	15.20	158.60	1,583.4	-42.9	12.2	-44.0	4.72	4.27	-8.96
1,683.0	16.90	157.60	1,674.7	-67.2	22.0	-70.2	1.81	1.79	-1.05
1,777.0	16.90	152.00	1,764.7	-91.9	33.6	-97.5	1.73	0.00	-5.96
1,871.0	16.50	150.90	1,854.7	-115.6	46.5	-124.5	0.54	-0.43	-1.17
1,965.0	16.10	152.90	1,944.9	-138.9	58.9	-150.8	0.73	-0.43	2.13
2,060.0	16.50	151.70	2,036.1	-162.5	71.3	-177.4	0.55	0.42	-1.26
2,154.0	16.00	152.30	2,126.3	-185.7	83.7	-203.7	0.56	-0.53	0.64
2,248.0	15.00	149.00	2,216.9	-207.6	96.0	-228.7	1.42	-1.06	-3.51
2,342.0	15.50	151.60	2,307.6	-229.1	108.2	-253.4	0.90	0.53	2.77
2,436.0	16.00	152.80	2,398.1	-251.7	120.1	-278.9	0.63	0.53	1.28
2,530.0	17.40	150.30	2,488.1	-275.4	133.0	-305.8	1.67	1.49	-2.66
2,624.0	16.50	147.70	2,578.0	-298.9	147.1	-333.1	1.25	-0.96	-2.77
2,719.0	16.30	154.60	2,669.2	-322.4	160.0	-359.8	2.06	-0.21	7.26
2,813.0	15.60	154.70	2,759.6	-345.7	171.1	-385.6	0.75	-0.74	0.11
2,907.0	17.60	150.20	2,849.6	-369.5	183.5	-412.4	2.53	2.13	-4.79
3,001.0	17.70	149.50	2,939.2	-394.1	197.8	-440.8	0.25	0.11	-0.74
3,096.0	16.70	150.80	3,030.0	-418.5	211.8	-468.8	1.13	-1.05	1.37
3,190.0	17.10	151.70	3,119.9	-442.4	225.0	-496.0	0.51	0.43	0.96
3,284.0	16.70	150.20	3,209.9	-466.3	238.2	-523.3	0.63	-0.43	-1.60
3,379.0	17.70	148.70	3,300.6	-490.5	252.5	-551.2	1.15	1.05	-1.58
3,473.0	17.70	149.60	3,390.2	-515.0	267.2	-579.7	0.29	0.00	0.96
3,567.0	17.50	147.90	3,479.8	-539.3	281.9	-607.9	0.59	-0.21	-1.81
3,661.0	17.40	147.20	3,569.4	-563.1	297.0	-635.9	0.25	-0.11	-0.74
3,755.0	17.90	147.40	3,659.0	-587.1	312.4	-664.1	0.54	0.53	0.21
3,850.0	17.00	149.30	3,749.6	-611.3	327.4	-692.4	1.12	-0.95	2.00
3,944.0	17.10	149.90	3,839.5	-635.1	341.3	-719.8	0.22	0.11	0.64
4,038.0	16.70	150.30	3,929.4	-658.8	355.0	-747.0	0.44	-0.43	0.43
4,132.0	16.70	149.70	4,019.5	-682.2	368.5	-773.9	0.18	0.00	-0.64
4,227.0	17.00	152.70	4,110.4	-706.3	381.7	-801.4	0.97	0.32	3.16
4,321.0	16.20	153.20	4,200.5	-730.2	393.9	-828.2	0.86	-0.85	0.53
4,415.0	16.30	153.90	4,290.7	-753.8	405.7	-854.5	0.23	0.11	0.74
4,509.0	16.40	153.20	4,380.9	-777.5	417.4	-881.0	0.24	0.11	-0.74
4,604.0	15.80	153.70	4,472.2	-801.0	429.2	-907.3	0.65	-0.63	0.53
4,698.0	15.60	155.60	4,562.7	-824.0	440.1	-932.8	0.59	-0.21	2.02
4,792.0	15.60	151.60	4,653.2	-846.7	451.3	-958.0	1.14	0.00	-4.26
4,887.0	14.80	152.50	4,744.9	-868.7	463.0	-982.9	0.88	-0.84	0.95



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4,981.0	13.60	153.80	4,836.0	-889.2	473.4	-1,005.9	1.32	-1.28	1.38	
5,075.0	12.48	155.97	4,927.6	-908.4	482.5	-1,027.1	1.30	-1.19	2.31	
5,169.0	11.38	157.81	5,019.6	-926.3	490.1	-1,046.5	1.24	-1.17	1.96	
5,264.0	10.50	157.11	5,112.8	-942.9	497.0	-1,064.6	0.94	-0.93	-0.74	
5,358.0	10.24	159.31	5,205.3	-958.6	503.3	-1,081.5	0.50	-0.28	2.34	
5,452.0	9.80	159.00	5,297.9	-973.9	509.1	-1,097.8	0.47	-0.47	-0.33	
5,546.0	7.90	149.40	5,390.8	-987.0	515.3	-1,112.2	2.55	-2.02	-10.21	
5,640.0	5.80	135.60	5,484.1	-995.9	521.9	-1,123.1	2.82	-2.23	-14.68	
5,735.0	3.70	123.80	5,578.8	-1,001.1	527.8	-1,130.2	2.43	-2.21	-12.42	
5,829.0	2.20	104.20	5,672.6	-1,003.2	532.1	-1,134.0	1.90	-1.60	-20.85	
5,923.0	2.64	114.39	5,766.6	-1,004.5	535.8	-1,136.7	0.65	0.47	10.84	
6,017.0	2.00	131.40	5,860.5	-1,006.5	539.0	-1,139.9	0.99	-0.68	18.10	
6,112.0	1.19	76.16	5,955.4	-1,007.4	541.2	-1,141.6	1.73	-0.85	-58.15	
6,206.0	1.27	63.15	6,049.4	-1,006.7	543.1	-1,141.7	0.31	0.09	-13.84	
6,300.0	1.20	78.40	6,143.4	-1,006.0	544.9	-1,141.9	0.36	-0.07	16.22	
6,394.0	1.30	99.50	6,237.4	-1,006.0	547.0	-1,142.8	0.50	0.11	22.45	
6,488.0	1.00	150.50	6,331.4	-1,006.9	548.4	-1,144.2	1.09	-0.32	54.26	
6,583.0	1.40	184.40	6,426.3	-1,008.7	548.7	-1,146.0	0.84	0.42	35.68	
6,677.0	1.10	184.00	6,520.3	-1,010.8	548.6	-1,147.8	0.32	-0.32	-0.43	
6,771.0	2.20	186.40	6,614.3	-1,013.5	548.3	-1,150.1	1.17	1.17	2.55	
6,865.0	1.80	189.10	6,708.2	-1,016.7	547.9	-1,152.9	0.44	-0.43	2.87	
6,959.0	2.40	194.90	6,802.2	-1,020.1	547.2	-1,155.6	0.68	0.64	6.17	
7,053.0	2.20	213.70	6,896.1	-1,023.5	545.6	-1,158.1	0.83	-0.21	20.00	
7,148.0	2.20	215.70	6,991.0	-1,026.5	543.6	-1,159.9	0.08	0.00	2.11	
7,242.0	2.40	221.90	7,084.9	-1,029.4	541.2	-1,161.6	0.34	0.21	6.60	
7,336.0	3.20	212.80	7,178.8	-1,033.1	538.5	-1,163.8	0.97	0.85	-9.68	
7,430.0	3.50	229.50	7,272.7	-1,037.1	534.9	-1,166.0	1.08	0.32	17.77	
7,524.0	3.10	228.00	7,366.5	-1,040.7	530.8	-1,167.5	0.44	-0.43	-1.60	
7,618.0	3.80	224.50	7,460.3	-1,044.6	526.7	-1,169.3	0.78	0.74	-3.72	
7,712.0	3.70	223.80	7,554.1	-1,049.0	522.4	-1,171.5	0.12	-0.11	-0.74	
7,807.0	3.25	231.20	7,649.0	-1,052.9	518.2	-1,173.3	0.67	-0.47	7.79	
Projection to TD @ 7873.0' MD / 7714.9' TVD										
7,873.0	3.25	231.20	7,714.9	-1,055.3	515.3	-1,174.2	0.00	0.00	0.00	

Design Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment	
		+N/-S (usft)	+E/-W (usft)		
110.0	110.0	-0.3	-0.1	First MWD Survey @ 110.0' MD / 110.0' TVD	
7,873.0	7,714.9	-1,055.3	515.3	Projection to TD @ 7873.0' MD / 7714.9' TVD	