



Laramie Energy, LLC

Mesa County, CO

Bruton 30-10 Pad

Bruton 30-21E

B-2

Design: B-2

QES Survey Report

03 February, 2018





Survey Report



Company:	Laramie Energy, LLC	Local Co-ordinate Reference:	Well Bruton 30-21E
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 30-21E	North Reference:	True
Wellbore:	B-2	Survey Calculation Method:	Minimum Curvature
Design:	B-2	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 30-21E					
Well Position	+N/-S	0.0 usft	Northing:	1,523,544.60 usft	Latitude:	39.248050
	+E/-W	0.0 usft	Easting:	2,346,230.76 usft	Longitude:	-107.808800
Position Uncertainty		0.0 usft	Wellhead Elevation:	0.0 usft	Ground Level:	7,643.0 usft

Wellbore	B-2				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	1/25/2018	9.52	65.41	51,338.21877590

Design	B-2				
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	157.92	

Survey Program	Date	2/3/2018			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
202.0	8,443.0	QES MWD Surveys (B-2)	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	
202.0	2.30	118.20	201.9	-1.9	3.6	3.1	1.14	1.14	0.00	
293.0	2.40	122.80	292.9	-3.8	6.8	6.1	0.23	0.11	5.05	
384.0	2.50	118.00	383.8	-5.8	10.1	9.2	0.25	0.11	-5.27	
475.0	2.50	149.90	474.7	-8.4	12.9	12.6	1.51	0.00	35.05	
567.0	2.70	159.60	566.6	-12.2	14.6	16.8	0.52	0.22	10.54	
654.0	3.30	167.10	653.5	-16.6	15.9	21.3	0.82	0.69	8.62	
745.0	5.70	157.40	744.2	-23.3	18.2	28.4	2.76	2.64	-10.66	
836.0	8.70	157.40	834.5	-33.8	22.6	39.8	3.30	3.30	0.00	
927.0	10.80	156.50	924.2	-48.0	28.7	55.2	2.31	2.31	-0.99	



Survey Report



Company:	Laramie Energy, LLC	Local Co-ordinate Reference:	Well Bruton 30-21E
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 30-21E	North Reference:	True
Wellbore:	B-2	Survey Calculation Method:	Minimum Curvature
Design:	B-2	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)	
1,019.0	13.10	159.10	1,014.2	-65.6	35.8	74.3	2.57	2.50	2.83	
1,113.0	16.40	161.60	1,105.0	-88.2	43.8	98.2	3.57	3.51	2.66	
1,207.0	19.60	160.50	1,194.4	-115.6	53.3	127.2	3.42	3.40	-1.17	
1,301.0	22.60	158.60	1,282.1	-147.3	65.1	161.0	3.27	3.19	-2.02	
1,395.0	24.60	158.20	1,368.3	-182.3	79.0	198.6	2.13	2.13	-0.43	
1,490.0	27.50	157.90	1,453.6	-221.0	94.6	240.3	3.06	3.05	-0.32	
1,516.0	27.60	157.10	1,476.7	-232.1	99.2	252.4	1.47	0.38	-3.08	
1,607.0	28.10	158.10	1,557.1	-271.4	115.4	294.9	0.75	0.55	1.10	
1,701.0	29.40	162.60	1,639.5	-314.0	130.5	340.0	2.69	1.38	4.79	
1,795.0	32.60	164.40	1,720.1	-360.4	144.3	388.2	3.54	3.40	1.91	
1,890.0	35.10	164.00	1,799.0	-411.3	158.7	440.8	2.64	2.63	-0.42	
1,984.0	35.60	162.20	1,875.7	-463.3	174.5	494.9	1.23	0.53	-1.91	
2,078.0	37.10	161.80	1,951.4	-516.3	191.7	550.5	1.62	1.60	-0.43	
2,172.0	38.30	158.40	2,025.7	-570.3	211.3	607.9	2.55	1.28	-3.62	
2,266.0	37.40	158.40	2,100.0	-624.0	232.5	665.6	0.96	-0.96	0.00	
2,360.0	36.30	158.20	2,175.2	-676.4	253.4	722.0	1.18	-1.17	-0.21	
2,455.0	35.20	159.40	2,252.3	-728.1	273.4	777.5	1.37	-1.16	1.26	
2,549.0	36.80	158.30	2,328.3	-779.6	293.4	832.7	1.84	1.70	-1.17	
2,643.0	37.60	157.50	2,403.2	-832.3	314.8	889.6	0.99	0.85	-0.85	
2,737.0	36.20	157.30	2,478.4	-884.4	336.5	946.0	1.49	-1.49	-0.21	
2,831.0	35.70	156.70	2,554.5	-935.2	358.0	1,001.2	0.65	-0.53	-0.64	
2,925.0	33.30	156.90	2,631.9	-984.1	379.0	1,054.4	2.56	-2.55	0.21	
3,020.0	33.90	158.90	2,711.1	-1,032.8	398.8	1,107.0	1.33	0.63	2.11	
3,114.0	35.50	156.90	2,788.3	-1,082.4	418.9	1,160.5	2.09	1.70	-2.13	
3,208.0	35.20	156.60	2,865.0	-1,132.3	440.4	1,214.8	0.37	-0.32	-0.32	
3,302.0	34.40	156.00	2,942.2	-1,181.5	461.9	1,268.5	0.93	-0.85	-0.64	
3,397.0	35.60	156.10	3,020.0	-1,231.3	484.0	1,322.9	1.26	1.26	0.11	
3,491.0	34.50	156.80	3,097.0	-1,280.8	505.6	1,376.9	1.25	-1.17	0.74	
3,585.0	33.40	157.10	3,174.9	-1,329.1	526.2	1,429.4	1.18	-1.17	0.32	
3,679.0	35.20	154.60	3,252.6	-1,377.4	547.9	1,482.3	2.43	1.91	-2.66	
3,773.0	34.10	154.20	3,329.9	-1,425.6	571.0	1,535.6	1.19	-1.17	-0.43	
3,867.0	35.70	154.50	3,407.0	-1,474.0	594.2	1,589.3	1.71	1.70	0.32	
3,962.0	34.70	154.60	3,484.6	-1,523.5	617.8	1,644.0	1.05	-1.05	0.11	
4,056.0	33.80	154.70	3,562.3	-1,571.3	640.4	1,696.8	0.96	-0.96	0.11	
4,150.0	35.10	155.10	3,639.9	-1,619.5	663.0	1,749.9	1.40	1.38	0.43	
4,244.0	34.20	155.10	3,717.2	-1,667.9	685.5	1,803.3	0.96	-0.96	0.00	
4,338.0	35.60	155.20	3,794.3	-1,716.7	708.1	1,857.0	1.49	1.49	0.11	
4,432.0	34.60	155.00	3,871.2	-1,765.8	730.8	1,911.0	1.07	-1.06	-0.21	
4,527.0	34.10	153.80	3,949.6	-1,814.1	754.0	1,964.5	0.89	-0.53	-1.26	
4,621.0	34.80	156.00	4,027.1	-1,862.3	776.5	2,017.6	1.52	0.74	2.34	
4,715.0	35.20	157.60	4,104.1	-1,911.8	797.8	2,071.5	1.06	0.43	1.70	
4,809.0	34.50	158.70	4,181.3	-1,961.7	817.8	2,125.2	1.00	-0.74	1.17	
4,903.0	33.60	158.70	4,259.2	-2,010.7	836.9	2,177.8	0.96	-0.96	0.00	
4,997.0	32.70	159.00	4,337.9	-2,058.6	855.4	2,229.2	0.97	-0.96	0.32	



Survey Report



Company:	Laramie Energy, LLC	Local Co-ordinate Reference:	Well Bruton 30-21E
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 30-21E	North Reference:	True
Wellbore:	B-2	Survey Calculation Method:	Minimum Curvature
Design:	B-2	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)
5,092.0	31.60	157.90	4,418.3	-2,105.7	874.0	2,279.8	1.31	-1.16	-1.16
5,186.0	29.40	157.00	4,499.3	-2,149.7	892.3	2,327.5	2.39	-2.34	-0.96
5,281.0	26.50	156.00	4,583.2	-2,190.5	910.0	2,372.0	3.09	-3.05	-1.05
5,375.0	25.30	156.40	4,667.7	-2,228.1	926.6	2,413.0	1.29	-1.28	0.43
5,469.0	23.90	156.80	4,753.2	-2,264.0	942.1	2,452.1	1.50	-1.49	0.43
5,563.0	22.50	156.90	4,839.6	-2,298.1	956.7	2,489.1	1.49	-1.49	0.11
5,657.0	20.90	154.30	4,926.9	-2,329.7	971.0	2,523.9	1.99	-1.70	-2.77
5,752.0	18.80	153.70	5,016.3	-2,358.7	985.1	2,556.0	2.22	-2.21	-0.63
5,846.0	16.10	154.30	5,106.0	-2,384.0	997.5	2,584.2	2.88	-2.87	0.64
5,940.0	13.80	153.70	5,196.8	-2,405.8	1,008.1	2,608.4	2.45	-2.45	-0.64
6,034.0	11.60	153.20	5,288.5	-2,424.3	1,017.4	2,629.0	2.34	-2.34	-0.53
6,129.0	8.70	145.80	5,382.0	-2,438.8	1,025.7	2,645.5	3.34	-3.05	-7.79
6,223.0	5.90	148.70	5,475.2	-2,448.8	1,032.2	2,657.2	3.00	-2.98	3.09
6,317.0	3.50	152.00	5,568.9	-2,455.5	1,036.1	2,664.9	2.57	-2.55	3.51
6,411.0	2.20	106.20	5,662.8	-2,458.5	1,039.2	2,668.8	2.68	-1.38	-48.72
6,505.0	1.80	101.50	5,756.7	-2,459.3	1,042.3	2,670.8	0.46	-0.43	-5.00
6,600.0	1.50	126.20	5,851.7	-2,460.3	1,044.8	2,672.6	0.80	-0.32	26.00
6,694.0	1.10	124.50	5,945.7	-2,461.6	1,046.5	2,674.4	0.43	-0.43	-1.81
6,788.0	1.00	145.80	6,039.6	-2,462.8	1,047.7	2,676.0	0.43	-0.11	22.66
6,883.0	1.40	171.30	6,134.6	-2,464.6	1,048.4	2,677.9	0.69	0.42	26.84
6,977.0	1.10	193.40	6,228.6	-2,466.6	1,048.3	2,679.8	0.60	-0.32	23.51
7,072.0	1.10	194.40	6,323.6	-2,468.4	1,047.9	2,681.3	0.02	0.00	1.05
7,166.0	1.50	199.20	6,417.6	-2,470.4	1,047.3	2,682.9	0.44	0.43	5.11
7,260.0	1.40	219.40	6,511.5	-2,472.5	1,046.1	2,684.4	0.55	-0.11	21.49
7,354.0	0.90	196.50	6,605.5	-2,474.1	1,045.2	2,685.5	0.71	-0.53	-24.36
7,448.0	1.10	237.00	6,699.5	-2,475.3	1,044.2	2,686.3	0.76	0.21	43.09
7,542.0	1.20	240.90	6,793.5	-2,476.2	1,042.6	2,686.6	0.14	0.11	4.15
7,637.0	1.40	240.30	6,888.5	-2,477.3	1,040.7	2,686.8	0.21	0.21	-0.63
7,731.0	1.10	229.60	6,982.4	-2,478.5	1,039.1	2,687.3	0.40	-0.32	-11.38
7,825.0	1.20	235.80	7,076.4	-2,479.6	1,037.6	2,687.8	0.17	0.11	6.60
7,919.0	1.40	245.30	7,170.4	-2,480.6	1,035.7	2,688.0	0.31	0.21	10.11
8,014.0	1.50	249.20	7,265.4	-2,481.5	1,033.5	2,688.0	0.15	0.11	4.11
8,108.0	1.40	242.20	7,359.3	-2,482.5	1,031.3	2,688.1	0.22	-0.11	-7.45
8,202.0	1.60	231.80	7,453.3	-2,483.9	1,029.3	2,688.6	0.36	0.21	-11.06
8,297.0	1.60	241.40	7,548.3	-2,485.3	1,027.1	2,689.1	0.28	0.00	10.11
8,383.0	2.00	237.40	7,634.2	-2,486.7	1,024.7	2,689.5	0.49	0.47	-4.65
Projection to TD @ 8443.0' MD / 7694.2' TVD									
8,443.0	2.00	237.40	7,694.2	-2,487.8	1,023.0	2,689.9	0.00	0.00	0.00



Survey Report



Company:	Laramie Energy, LLC	Local Co-ordinate Reference:	Well Bruton 30-21E
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 30-21E	North Reference:	True
Wellbore:	B-2	Survey Calculation Method:	Minimum Curvature
Design:	B-2	Database:	EDM 5000.1 Single User Db

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
8,443.0	7,694.2	-2,487.8	1,023.0	Projection to TD @ 8443.0' MD / 7694.2' TVD

Checked By: _____ Approved By: _____ Date: _____