



Laramie Energy, LLC

Mesa County, CO

Bruton 30-10 Pad

Bruton Federal 31-01E

B-1

Design: B-1

QES Survey Report

08 February, 2018





Survey Report



Company:	Laramie Energy, LLC	Local Co-ordinate Reference:	Well Bruton Federal 31-01E
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 Federal 31-01E	North Reference:	True
Wellbore:	B-1	Survey Calculation Method:	Minimum Curvature
Design:	B-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 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 Federal 31-01E					
Well Position	+N/-S	0.0 usft	Northing:	1,523,535.37 usft	Latitude:	39.248025
	+E/-W	0.0 usft	Easting:	2,346,235.34 usft	Longitude:	-107.808783
Position Uncertainty		0.0 usft	Wellhead Elevation:	0.0 usft	Ground Level:	7,643.0 usft

Wellbore	B-1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	1/25/2018	9.52	65.41	51,338.20743914

Design	B-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	167.75	

Survey Program	Date	2/8/2018			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
199.0	8,424.0	QES MWD Surveys (B-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 @ 199.0' MD / 198.9' TVD										
199.0	3.50	181.50	198.9	-6.1	-0.2	5.9	1.76	1.76	0.00	
289.0	3.70	182.00	288.7	-11.7	-0.3	11.4	0.22	0.22	0.56	
381.0	4.00	179.20	380.5	-17.9	-0.4	17.4	0.38	0.33	-3.04	
472.0	6.60	186.30	471.1	-26.3	-0.9	25.5	2.94	2.86	7.80	
563.0	9.50	178.30	561.2	-39.0	-1.3	37.8	3.41	3.19	-8.79	
675.0	11.90	174.00	671.2	-59.7	0.2	58.4	2.26	2.14	-3.84	
745.0	13.50	178.60	739.5	-75.1	1.2	73.6	2.70	2.29	6.57	
837.0	15.30	177.90	828.6	-97.9	1.9	96.1	1.97	1.96	-0.76	
928.0	17.50	178.40	915.9	-123.6	2.7	121.4	2.42	2.42	0.55	



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Design:	B-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)
1,019.0	20.80	180.70	1,001.9	-153.4	2.9	150.6	3.72	3.63	2.53
1,113.0	23.80	181.00	1,088.8	-189.1	2.3	185.3	3.19	3.19	0.32
1,207.0	27.10	183.60	1,173.7	-229.4	0.7	224.4	3.71	3.51	2.77
1,301.0	30.50	181.40	1,256.1	-274.7	-1.3	268.2	3.79	3.62	-2.34
1,395.0	33.60	180.40	1,335.7	-324.5	-2.0	316.7	3.35	3.30	-1.06
1,480.0	35.00	177.20	1,406.0	-372.4	-1.0	363.7	2.69	1.65	-3.76
1,609.0	34.10	173.70	1,512.2	-445.3	4.8	436.2	1.69	-0.70	-2.71
1,703.0	34.80	169.50	1,589.7	-497.9	12.6	489.2	2.63	0.74	-4.47
1,797.0	34.50	166.00	1,667.1	-550.1	23.9	542.6	2.14	-0.32	-3.72
1,892.0	34.20	164.70	1,745.5	-602.0	37.4	596.2	0.83	-0.32	-1.37
1,986.0	34.20	164.20	1,823.3	-652.9	51.6	648.9	0.30	0.00	-0.53
2,080.0	35.30	166.90	1,900.5	-704.7	65.0	702.5	2.01	1.17	2.87
2,175.0	35.60	166.20	1,977.9	-758.3	77.8	757.6	0.53	0.32	-0.74
2,269.0	35.50	165.20	2,054.4	-811.3	91.3	812.2	0.63	-0.11	-1.06
2,363.0	35.60	164.90	2,130.8	-864.1	105.4	866.8	0.21	0.11	-0.32
2,457.0	35.20	166.70	2,207.5	-916.9	118.7	921.2	1.19	-0.43	1.91
2,551.0	34.50	168.40	2,284.6	-969.3	130.3	974.9	1.27	-0.74	1.81
2,646.0	34.30	168.80	2,363.0	-1,021.9	140.9	1,028.6	0.32	-0.21	0.42
2,740.0	33.80	168.20	2,440.9	-1,073.5	151.4	1,081.2	0.64	-0.53	-0.64
2,834.0	33.80	166.90	2,519.0	-1,124.6	162.7	1,133.5	0.77	0.00	-1.38
2,928.0	33.00	166.50	2,597.5	-1,174.9	174.6	1,185.2	0.88	-0.85	-0.43
3,022.0	33.00	166.30	2,676.3	-1,224.7	186.6	1,236.4	0.12	0.00	-0.21
3,116.0	33.50	167.20	2,754.9	-1,274.8	198.4	1,287.9	0.75	0.53	0.96
3,211.0	33.60	167.70	2,834.1	-1,326.1	209.8	1,340.4	0.31	0.11	0.53
3,305.0	34.00	166.80	2,912.2	-1,377.1	221.4	1,392.7	0.68	0.43	-0.96
3,399.0	34.00	165.90	2,990.1	-1,428.2	233.8	1,445.3	0.54	0.00	-0.96
3,493.0	34.30	164.30	3,067.9	-1,479.2	247.4	1,498.0	1.01	0.32	-1.70
3,587.0	34.60	164.20	3,145.4	-1,530.3	261.8	1,551.0	0.32	0.32	-0.11
3,682.0	35.00	162.80	3,223.4	-1,582.3	277.2	1,605.1	0.94	0.42	-1.47
3,776.0	34.90	162.60	3,300.5	-1,633.7	293.2	1,658.7	0.16	-0.11	-0.21
3,870.0	35.30	161.60	3,377.4	-1,685.2	309.8	1,712.5	0.75	0.43	-1.06
3,964.0	34.00	164.20	3,454.7	-1,736.2	325.6	1,765.8	2.09	-1.38	2.77
4,058.0	32.60	167.40	3,533.3	-1,786.2	338.2	1,817.3	2.39	-1.49	3.40
4,153.0	32.40	167.40	3,613.4	-1,836.1	349.4	1,868.4	0.21	-0.21	0.00
4,247.0	32.40	166.90	3,692.8	-1,885.2	360.6	1,918.7	0.29	0.00	-0.53
4,341.0	32.10	166.20	3,772.3	-1,933.9	372.2	1,968.9	0.51	-0.32	-0.74
4,435.0	32.70	166.60	3,851.7	-1,982.9	384.1	2,019.2	0.68	0.64	0.43
4,529.0	33.00	165.80	3,930.6	-2,032.4	396.2	2,070.2	0.56	0.32	-0.85
4,624.0	32.60	164.70	4,010.5	-2,082.2	409.3	2,121.6	0.76	-0.42	-1.16
4,718.0	32.40	164.70	4,089.8	-2,130.9	422.7	2,172.1	0.21	-0.21	0.00
4,812.0	32.40	163.90	4,169.1	-2,179.4	436.3	2,222.3	0.46	0.00	-0.85
4,906.0	32.60	162.40	4,248.4	-2,227.7	450.9	2,272.7	0.88	0.21	-1.60
5,000.0	32.40	163.00	4,327.7	-2,275.9	466.0	2,323.0	0.40	-0.21	0.64



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Survey										
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5,094.0	31.60	164.70	4,407.4	-2,323.8	479.8	2,372.7	1.28	-0.85	1.81	
5,188.0	30.10	166.10	4,488.1	-2,370.4	492.0	2,420.8	1.77	-1.60	1.49	
5,283.0	27.10	170.60	4,571.5	-2,414.9	501.2	2,466.3	3.89	-3.16	4.74	
5,377.0	24.50	173.40	4,656.1	-2,455.4	507.0	2,507.1	3.05	-2.77	2.98	
5,471.0	23.90	172.50	4,741.9	-2,493.6	511.7	2,545.4	0.75	-0.64	-0.96	
5,565.0	22.20	173.60	4,828.4	-2,530.2	516.2	2,582.1	1.87	-1.81	1.17	
5,660.0	20.20	172.90	4,916.9	-2,564.3	520.2	2,616.3	2.12	-2.11	-0.74	
5,754.0	18.40	173.10	5,005.6	-2,595.1	524.0	2,647.2	1.92	-1.91	0.21	
5,848.0	16.00	176.40	5,095.4	-2,622.8	526.6	2,674.8	2.76	-2.55	3.51	
5,942.0	13.10	173.40	5,186.4	-2,646.3	528.6	2,698.2	3.19	-3.09	-3.19	
6,037.0	11.50	172.30	5,279.2	-2,666.4	531.1	2,718.4	1.70	-1.68	-1.16	
6,131.0	10.00	176.60	5,371.6	-2,683.8	532.9	2,735.8	1.81	-1.60	4.57	
6,225.0	9.20	177.80	5,464.3	-2,699.5	533.6	2,751.2	0.88	-0.85	1.28	
6,319.0	7.30	176.40	5,557.3	-2,712.9	534.3	2,764.5	2.03	-2.02	-1.49	
6,414.0	6.00	180.40	5,651.6	-2,723.9	534.7	2,775.3	1.45	-1.37	4.21	
6,508.0	4.70	189.30	5,745.2	-2,732.6	534.0	2,783.7	1.64	-1.38	9.47	
6,600.0	3.50	215.40	5,837.0	-2,738.6	531.8	2,789.1	2.38	-1.30	28.37	
6,696.0	3.60	240.90	5,932.8	-2,742.5	527.4	2,792.0	1.63	0.10	26.56	
6,791.0	3.30	251.40	6,027.7	-2,744.8	522.2	2,793.1	0.73	-0.32	11.05	
6,885.0	3.20	268.30	6,121.5	-2,745.8	517.0	2,793.0	1.02	-0.11	17.98	
6,979.0	1.80	277.20	6,215.4	-2,745.7	513.0	2,792.0	1.54	-1.49	9.47	
7,073.0	1.60	319.60	6,309.4	-2,744.5	510.6	2,790.3	1.32	-0.21	45.11	
7,167.0	2.30	341.40	6,403.3	-2,741.7	509.2	2,787.3	1.07	0.74	23.19	
7,262.0	2.30	345.70	6,498.2	-2,738.0	508.1	2,783.5	0.18	0.00	4.53	
7,357.0	2.40	317.30	6,593.2	-2,734.7	506.3	2,779.9	1.22	0.11	-29.89	
7,451.0	1.90	292.60	6,687.1	-2,732.7	503.5	2,777.3	1.11	-0.53	-26.28	
7,545.0	2.30	277.90	6,781.0	-2,731.8	500.2	2,775.8	0.71	0.43	-15.64	
7,639.0	2.40	259.30	6,875.0	-2,731.9	496.4	2,775.1	0.81	0.11	-19.79	
7,734.0	1.60	260.90	6,969.9	-2,732.5	493.1	2,774.9	0.84	-0.84	1.68	
7,828.0	1.40	269.30	7,063.9	-2,732.7	490.7	2,774.6	0.32	-0.21	8.94	
7,922.0	1.80	261.30	7,157.8	-2,733.0	488.1	2,774.3	0.49	0.43	-8.51	
8,016.0	2.60	256.30	7,251.8	-2,733.7	484.6	2,774.3	0.87	0.85	-5.32	
8,110.0	3.20	252.30	7,345.6	-2,735.0	480.0	2,774.6	0.67	0.64	-4.26	
8,204.0	3.50	249.40	7,439.5	-2,736.8	474.8	2,775.2	0.37	0.32	-3.09	
8,299.0	3.80	244.80	7,534.3	-2,739.2	469.2	2,776.4	0.44	0.32	-4.84	
8,364.0	3.70	243.10	7,599.2	-2,741.0	465.4	2,777.4	0.23	-0.15	-2.62	
Projection to TD @ 8424.0' MD / 7659.0' TVD										
8,424.0	3.70	243.10	7,659.0	-2,742.8	462.0	2,778.4	0.00	0.00	0.00	



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Design Annotations

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		+N/-S (usft)	+E/-W (usft)	
199.0	198.9	-6.1	-0.2	First MWD Survey @ 199.0' MD / 198.9' TVD
8,424.0	7,659.0	-2,742.8	462.0	Projection to TD @ 8424.0' MD / 7659.0' TVD

Checked By: _____ Approved By: _____ Date: _____