



Laramie Energy, LLC

Mesa County, CO

Bruton 30-10 Pad

Bruton Federal 30-21W

A-1

Design: A-1

QES Survey Report

14 February, 2018





Survey Report



Company:	Laramie Energy, LLC	Local Co-ordinate Reference:	Well Bruton Federal 30-21W
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 30-21W	North Reference:	True
Wellbore:	A-1	Survey Calculation Method:	Minimum Curvature
Design:	A-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 30-21W			
Well Position	+N/-S	0.0 usft	Northing:	1,523,530.50 usft
	+E/-W	0.0 usft	Easting:	2,346,226.44 usft
Position Uncertainty	0.0 usft		Wellhead Elevation:	0.0 usft
			Ground Level:	7,643.0 usft

Wellbore	A-1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	1/25/2018	9.52	65.41	51,338.19597080

Design	A-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	213.79

Survey Program	Date	2/14/2018		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
199.0	8,489.0	QES MWD Surveys (A-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 / 198.8' TVD									
199.0	4.90	220.70	198.8	-6.4	-5.5	8.4	2.46	2.46	0.00
289.0	8.10	211.50	288.2	-14.8	-11.4	18.6	3.73	3.56	-10.22
381.0	8.70	210.60	379.2	-26.3	-18.3	32.0	0.67	0.65	-0.98
472.0	9.50	212.10	469.0	-38.6	-25.8	46.4	0.92	0.88	1.65
563.0	11.50	207.60	558.5	-53.0	-34.0	62.9	2.37	2.20	-4.95
654.0	14.50	212.50	647.2	-70.6	-44.3	83.3	3.51	3.30	5.38
745.0	18.20	212.80	734.5	-92.2	-58.1	108.9	4.07	4.07	0.33
837.0	19.10	211.10	821.6	-117.2	-73.7	138.3	1.14	0.98	-1.85
928.0	19.70	210.20	907.5	-143.2	-89.1	168.5	0.74	0.66	-0.99



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Wellbore:	A-1	Survey Calculation Method:	Minimum Curvature
Design:	A-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	21.00	212.80	992.8	-170.1	-105.6	200.1	1.74	1.43	2.86
1,113.0	24.00	214.40	1,079.6	-200.1	-125.6	236.1	3.26	3.19	1.70
1,207.0	28.80	215.10	1,163.8	-234.4	-149.4	277.9	5.12	5.11	0.74
1,301.0	32.40	213.30	1,244.7	-274.0	-176.3	325.7	3.95	3.83	-1.91
1,395.0	35.20	212.00	1,322.8	-318.0	-204.5	378.0	3.08	2.98	-1.38
1,485.0	35.90	212.70	1,396.0	-362.2	-232.5	430.3	0.90	0.78	0.78
1,610.0	35.60	211.80	1,497.5	-424.0	-271.4	503.3	0.48	-0.24	-0.72
1,704.0	35.10	210.40	1,574.2	-470.5	-299.5	557.6	1.01	-0.53	-1.49
1,798.0	34.80	214.10	1,651.2	-516.1	-328.2	611.4	2.28	-0.32	3.94
1,892.0	33.80	213.40	1,728.9	-560.1	-357.7	664.4	1.14	-1.06	-0.74
1,987.0	34.70	215.50	1,807.4	-604.2	-387.9	717.9	1.56	0.95	2.21
2,081.0	35.00	215.80	1,884.5	-647.8	-419.2	771.5	0.37	0.32	0.32
2,176.0	34.10	215.50	1,962.8	-691.6	-450.6	825.4	0.96	-0.95	-0.32
2,270.0	35.80	216.50	2,039.8	-735.2	-482.3	879.2	1.91	1.81	1.06
2,364.0	35.00	217.00	2,116.4	-778.8	-514.9	933.6	0.91	-0.85	0.53
2,458.0	35.90	218.60	2,193.0	-821.9	-548.3	988.0	1.38	0.96	1.70
2,552.0	34.80	218.40	2,269.7	-864.4	-582.1	1,042.2	1.18	-1.17	-0.21
2,647.0	35.70	217.30	2,347.3	-907.7	-615.8	1,096.8	1.16	0.95	-1.16
2,741.0	35.90	215.80	2,423.5	-951.9	-648.5	1,151.8	0.96	0.21	-1.60
2,835.0	35.50	213.30	2,499.8	-997.0	-679.6	1,206.6	1.61	-0.43	-2.66
2,929.0	34.10	212.80	2,577.0	-1,042.0	-708.9	1,260.2	1.52	-1.49	-0.53
3,024.0	35.20	214.10	2,655.2	-1,087.1	-738.7	1,314.3	1.39	1.16	1.37
3,118.0	36.60	213.40	2,731.3	-1,132.9	-769.3	1,369.4	1.55	1.49	-0.74
3,212.0	35.70	213.10	2,807.2	-1,179.3	-799.7	1,424.8	0.98	-0.96	-0.32
3,306.0	34.80	214.00	2,884.0	-1,224.5	-829.7	1,479.1	1.11	-0.96	0.96
3,400.0	36.60	215.10	2,960.3	-1,269.7	-860.8	1,533.9	2.03	1.91	1.17
3,494.0	35.60	215.50	3,036.3	-1,314.9	-892.8	1,589.3	1.09	-1.06	0.43
3,589.0	36.30	215.70	3,113.2	-1,360.2	-925.2	1,645.0	0.75	0.74	0.21
3,683.0	37.00	216.10	3,188.6	-1,405.7	-958.2	1,701.1	0.79	0.74	0.43
3,777.0	35.70	216.50	3,264.3	-1,450.6	-991.1	1,756.8	1.41	-1.38	0.43
3,871.0	36.60	215.70	3,340.2	-1,495.4	-1,023.8	1,812.2	1.08	0.96	-0.85
3,965.0	35.40	215.50	3,416.3	-1,540.3	-1,056.0	1,867.4	1.28	-1.28	-0.21
4,060.0	36.80	212.80	3,493.0	-1,586.6	-1,087.4	1,923.3	2.23	1.47	-2.84
4,154.0	35.70	211.50	3,568.8	-1,633.7	-1,116.9	1,978.9	1.43	-1.17	-1.38
4,248.0	37.00	212.10	3,644.5	-1,681.0	-1,146.3	2,034.6	1.43	1.38	0.64
4,342.0	35.80	211.40	3,720.2	-1,728.4	-1,175.7	2,090.3	1.35	-1.28	-0.74
4,436.0	37.30	211.70	3,795.7	-1,776.1	-1,205.0	2,146.3	1.61	1.60	0.32
4,530.0	36.40	211.30	3,870.9	-1,824.2	-1,234.4	2,202.6	0.99	-0.96	-0.43
4,625.0	35.20	210.40	3,948.0	-1,871.9	-1,262.9	2,258.1	1.38	-1.26	-0.95
4,719.0	37.00	211.70	4,023.9	-1,919.3	-1,291.5	2,313.4	2.08	1.91	1.38
4,813.0	36.70	212.20	4,099.1	-1,967.2	-1,321.3	2,369.7	0.45	-0.32	0.53
4,907.0	35.90	211.60	4,174.9	-2,014.4	-1,350.7	2,425.4	0.93	-0.85	-0.64
5,001.0	34.80	210.00	4,251.6	-2,061.1	-1,378.6	2,479.7	1.53	-1.17	-1.70



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Survey										
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5,095.0	33.90	210.60	4,329.2	-2,106.9	-1,405.3	2,532.6	1.02	-0.96	0.64	
5,189.0	31.50	210.40	4,408.3	-2,150.7	-1,431.1	2,583.3	2.56	-2.55	-0.21	
5,284.0	29.20	210.40	4,490.2	-2,192.1	-1,455.4	2,631.2	2.42	-2.42	0.00	
5,378.0	27.30	209.70	4,573.0	-2,230.6	-1,477.7	2,675.6	2.05	-2.02	-0.74	
5,472.0	25.70	212.70	4,657.2	-2,266.5	-1,499.4	2,717.5	2.22	-1.70	3.19	
5,566.0	24.70	211.50	4,742.2	-2,300.4	-1,520.7	2,757.5	1.19	-1.06	-1.28	
5,661.0	20.40	214.10	4,829.9	-2,331.0	-1,540.3	2,793.9	4.65	-4.53	2.74	
5,755.0	18.60	215.50	4,918.5	-2,356.8	-1,558.2	2,825.3	1.98	-1.91	1.49	
5,849.0	16.00	214.50	5,008.3	-2,379.7	-1,574.3	2,853.2	2.78	-2.77	-1.06	
5,944.0	13.50	212.00	5,100.1	-2,399.9	-1,587.5	2,877.4	2.71	-2.63	-2.63	
6,038.0	12.30	213.10	5,191.8	-2,417.6	-1,598.8	2,898.4	1.30	-1.28	1.17	
6,132.0	9.40	211.90	5,284.1	-2,432.5	-1,608.4	2,916.1	3.09	-3.09	-1.28	
6,226.0	5.80	219.90	5,377.2	-2,442.6	-1,615.5	2,928.5	3.98	-3.83	8.51	
6,320.0	2.90	218.70	5,471.0	-2,448.1	-1,620.0	2,935.6	3.09	-3.09	-1.28	
6,415.0	1.20	250.60	5,565.9	-2,450.3	-1,622.4	2,938.7	2.09	-1.79	33.58	
6,509.0	1.10	249.70	5,659.9	-2,451.0	-1,624.2	2,940.3	0.11	-0.11	-0.96	
6,603.0	1.40	266.90	5,753.9	-2,451.4	-1,626.2	2,941.7	0.51	0.32	18.30	
6,698.0	1.80	260.70	5,848.8	-2,451.7	-1,628.8	2,943.4	0.46	0.42	-6.53	
6,792.0	0.60	285.20	5,942.8	-2,451.8	-1,630.8	2,944.6	1.36	-1.28	26.06	
6,886.0	0.90	250.50	6,036.8	-2,451.9	-1,631.9	2,945.3	0.57	0.32	-36.91	
6,980.0	1.40	243.20	6,130.8	-2,452.6	-1,633.7	2,946.9	0.55	0.53	-7.77	
7,074.0	1.50	257.10	6,224.7	-2,453.4	-1,635.9	2,948.8	0.39	0.11	14.79	
7,169.0	1.60	240.20	6,319.7	-2,454.4	-1,638.2	2,950.9	0.49	0.11	-17.79	
7,263.0	1.90	231.80	6,413.7	-2,456.0	-1,640.6	2,953.6	0.42	0.32	-8.94	
7,357.0	2.60	213.00	6,507.6	-2,458.7	-1,643.0	2,957.2	1.07	0.74	-20.00	
7,452.0	2.50	210.90	6,602.5	-2,462.3	-1,645.2	2,961.4	0.14	-0.11	-2.21	
7,546.0	2.60	189.10	6,696.4	-2,466.2	-1,646.6	2,965.4	1.03	0.11	-23.19	
7,640.0	0.90	230.00	6,790.4	-2,468.8	-1,647.5	2,968.0	2.14	-1.81	43.51	
7,735.0	0.90	218.10	6,885.4	-2,469.8	-1,648.6	2,969.5	0.20	0.00	-12.53	
7,829.0	1.40	198.70	6,979.3	-2,471.5	-1,649.4	2,971.3	0.67	0.53	-20.64	
7,923.0	1.80	213.90	7,073.3	-2,473.8	-1,650.6	2,973.9	0.62	0.43	16.17	
8,017.0	2.10	215.80	7,167.2	-2,476.4	-1,652.4	2,977.1	0.33	0.32	2.02	
8,111.0	2.60	216.40	7,261.2	-2,479.6	-1,654.7	2,981.0	0.53	0.53	0.64	
8,205.0	3.00	228.60	7,355.1	-2,482.9	-1,657.8	2,985.5	0.76	0.43	12.98	
8,300.0	2.80	237.90	7,449.9	-2,485.8	-1,661.6	2,990.0	0.54	-0.21	9.79	
8,394.0	2.60	230.00	7,543.8	-2,488.4	-1,665.2	2,994.1	0.45	-0.21	-8.40	
8,429.0	2.80	225.40	7,578.8	-2,489.5	-1,666.4	2,995.7	0.84	0.57	-13.14	
Projection to TD @ 8489.0' MD / 7638.7' TVD										
8,489.0	2.80	225.40	7,638.7	-2,491.5	-1,668.5	2,998.6	0.00	0.00	0.00	



Survey Report



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Site:	Bruton 30-10 Pad	MD Reference:	well @ 7673.0usft (H&P #522)
Well:	Bruton Federal 30-21W	North Reference:	True
Wellbore:	A-1	Survey Calculation Method:	Minimum Curvature
Design:	A-1	Database:	EDM 5000.1 Single User Db

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
199.0	198.8	-6.4	-5.5	First MWD Survey @ 199.0' MD / 198.8' TVD
8,489.0	7,638.7	-2,491.5	-1,668.5	Projection to TD @ 8489.0' MD / 7638.7' TVD