



Laramie Energy, LLC

Mesa County, CO

Bruton 30-10 Pad

Bruton 30-16W

A-6

Design: A-6

QES Survey Report

27 December, 2017





Survey Report



Company:	Laramie Energy, LLC	Local Co-ordinate Reference:	Well Bruton 30-16W
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 30-16W	North Reference:	True
Wellbore:	A-6	Survey Calculation Method:	Minimum Curvature
Design:	A-6	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 30-16W					
Well Position	+N/-S	0.0 usft	Northing:	1,523,574.83 usft	Latitude:	39.248131
	+E/-W	0.0 usft	Easting:	2,346,202.35 usft	Longitude:	-107.808903
Position Uncertainty		0.0 usft	Wellhead Elevation:	0.0 usft	Ground Level:	7,643.0 usft

Wellbore	A-6				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	12/21/2017	9.53	65.41	51,348.89650855

Design	A-6				
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	239.94	

Survey Program	Date	12/27/2017			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
111.0	8,195.0	QES MWD Surveys (A-6)	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 @ 111.0' MD / 111.0' TVD										
111.0	1.40	238.70	111.0	-0.7	-1.2	1.4	1.26	1.26	0.00	
202.0	2.70	245.20	201.9	-2.2	-4.1	4.6	1.45	1.43	7.14	
293.0	4.00	235.40	292.8	-4.9	-8.6	9.9	1.56	1.43	-10.77	
384.0	6.20	238.30	383.4	-9.3	-15.4	18.0	2.43	2.42	3.19	
476.0	9.00	238.40	474.6	-15.6	-25.8	30.1	3.04	3.04	0.11	
567.0	11.60	238.10	564.1	-24.2	-39.6	46.4	2.86	2.86	-0.33	
658.0	15.20	235.20	652.6	-35.9	-57.2	67.4	4.02	3.96	-3.19	
749.0	18.10	237.80	739.8	-50.2	-78.9	93.5	3.29	3.19	2.86	
840.0	20.60	240.90	825.7	-65.5	-104.9	123.6	2.97	2.75	3.41	



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Wellbore:	A-6	Survey Calculation Method:	Minimum Curvature
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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)
931.0	23.50	240.40	910.0	-82.3	-134.7	157.8	3.19	3.19	-0.55
1,022.0	26.60	238.50	992.4	-101.9	-167.8	196.3	3.52	3.41	-2.09
1,117.0	28.20	239.60	1,076.8	-124.4	-205.3	240.0	1.77	1.68	1.16
1,211.0	28.50	238.80	1,159.5	-147.2	-243.6	284.6	0.51	0.32	-0.85
1,305.0	28.70	238.10	1,242.0	-170.8	-282.0	329.6	0.42	0.21	-0.74
1,399.0	28.40	236.00	1,324.6	-195.2	-319.7	374.5	1.11	-0.32	-2.23
1,493.0	28.60	235.90	1,407.2	-220.3	-356.8	419.2	0.22	0.21	-0.11
1,617.0	28.30	236.80	1,516.2	-253.0	-406.0	478.2	0.42	-0.24	0.73
1,711.0	27.50	239.00	1,599.3	-276.4	-443.3	522.1	1.39	-0.85	2.34
1,805.0	28.40	240.40	1,682.3	-298.6	-481.3	566.2	1.18	0.96	1.49
1,899.0	27.20	240.60	1,765.5	-320.2	-519.5	610.0	1.28	-1.28	0.21
1,994.0	27.80	239.60	1,849.8	-342.1	-557.5	653.9	0.80	0.63	-1.05
2,088.0	28.60	242.00	1,932.6	-363.8	-596.3	698.3	1.48	0.85	2.55
2,182.0	27.90	241.00	2,015.4	-385.0	-635.4	742.7	0.90	-0.74	-1.06
2,276.0	28.40	242.70	2,098.3	-405.9	-674.5	787.1	1.01	0.53	1.81
2,370.0	26.90	242.60	2,181.5	-425.9	-713.2	830.6	1.60	-1.60	-0.11
2,464.0	27.70	242.00	2,265.1	-446.0	-751.4	873.7	0.90	0.85	-0.64
2,559.0	28.70	241.30	2,348.8	-467.3	-790.9	918.6	1.11	1.05	-0.74
2,653.0	29.40	243.20	2,431.0	-488.5	-831.3	964.2	1.23	0.74	2.02
2,747.0	27.20	242.40	2,513.7	-508.9	-870.9	1,008.7	2.37	-2.34	-0.85
2,841.0	26.10	241.60	2,597.7	-528.7	-908.1	1,050.8	1.23	-1.17	-0.85
2,935.0	25.80	240.70	2,682.3	-548.5	-944.2	1,091.9	0.53	-0.32	-0.96
3,030.0	26.70	240.90	2,767.5	-569.0	-980.8	1,134.0	0.95	0.95	0.21
3,124.0	27.50	242.20	2,851.2	-589.4	-1,018.5	1,176.8	1.06	0.85	1.38
3,218.0	28.10	242.30	2,934.3	-609.8	-1,057.3	1,220.6	0.64	0.64	0.11
3,313.0	28.80	241.60	3,017.8	-631.1	-1,097.2	1,265.8	0.82	0.74	-0.74
3,407.0	30.50	243.00	3,099.5	-652.7	-1,138.4	1,312.2	1.95	1.81	1.49
3,501.0	29.00	242.90	3,181.1	-673.9	-1,180.0	1,358.8	1.60	-1.60	-0.11
3,595.0	29.40	244.30	3,263.2	-694.3	-1,221.0	1,404.6	0.84	0.43	1.49
3,689.0	29.00	242.40	3,345.2	-714.9	-1,262.0	1,450.4	1.07	-0.43	-2.02
3,784.0	29.50	240.50	3,428.1	-737.1	-1,302.8	1,496.8	1.11	0.53	-2.00
3,878.0	30.80	239.90	3,509.4	-760.5	-1,343.7	1,544.0	1.42	1.38	-0.64
3,972.0	29.40	238.80	3,590.7	-784.6	-1,384.3	1,591.1	1.60	-1.49	-1.17
4,067.0	28.60	240.00	3,673.8	-808.0	-1,423.9	1,637.2	1.04	-0.84	1.26
4,161.0	27.90	239.20	3,756.6	-830.5	-1,462.3	1,681.6	0.85	-0.74	-0.85
4,255.0	26.80	237.50	3,840.1	-853.2	-1,499.1	1,724.8	1.44	-1.17	-1.81
4,349.0	27.20	237.50	3,923.9	-876.1	-1,535.1	1,767.5	0.43	0.43	0.00
4,443.0	26.20	238.30	4,007.8	-898.5	-1,570.8	1,809.7	1.13	-1.06	0.85
4,538.0	27.20	241.70	4,092.7	-919.9	-1,607.8	1,852.3	1.92	1.05	3.58
4,632.0	27.90	242.20	4,176.1	-940.3	-1,646.2	1,895.8	0.78	0.74	0.53
4,726.0	28.50	241.40	4,258.9	-961.3	-1,685.3	1,940.2	0.75	0.64	-0.85
4,821.0	28.50	244.20	4,342.4	-982.0	-1,725.6	1,985.4	1.41	0.00	2.95
4,915.0	27.50	243.60	4,425.4	-1,001.4	-1,765.3	2,029.5	1.11	-1.06	-0.64



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Survey										
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5,009.0	26.30	244.20	4,509.2	-1,020.1	-1,803.5	2,071.9	1.31	-1.28	0.64	
5,104.0	25.00	245.20	4,594.9	-1,037.7	-1,840.6	2,112.9	1.44	-1.37	1.05	
5,198.0	23.50	243.50	4,680.6	-1,054.4	-1,875.4	2,151.3	1.76	-1.60	-1.81	
5,292.0	22.60	243.70	4,767.1	-1,070.8	-1,908.4	2,188.1	0.96	-0.96	0.21	
5,386.0	21.00	243.70	4,854.3	-1,086.2	-1,939.7	2,222.9	1.70	-1.70	0.00	
5,480.0	19.40	241.90	4,942.5	-1,101.1	-1,968.6	2,255.3	1.83	-1.70	-1.91	
5,575.0	17.90	240.10	5,032.6	-1,115.8	-1,995.1	2,285.7	1.69	-1.58	-1.89	
5,669.0	17.20	241.00	5,122.2	-1,129.7	-2,019.8	2,314.0	0.80	-0.74	0.96	
5,763.0	14.80	238.30	5,212.5	-1,142.8	-2,042.2	2,339.9	2.67	-2.55	-2.87	
5,857.0	13.40	238.90	5,303.7	-1,154.7	-2,061.7	2,362.8	1.50	-1.49	0.64	
5,951.0	10.80	240.90	5,395.6	-1,164.6	-2,078.8	2,382.5	2.80	-2.77	2.13	
6,046.0	8.00	240.80	5,489.3	-1,172.2	-2,092.3	2,398.0	2.95	-2.95	-0.11	
6,140.0	5.50	232.70	5,582.7	-1,178.1	-2,101.6	2,409.1	2.84	-2.66	-8.62	
6,234.0	3.60	231.80	5,676.4	-1,182.6	-2,107.5	2,416.4	2.02	-2.02	-0.96	
6,328.0	2.80	217.00	5,770.2	-1,186.3	-2,111.2	2,421.5	1.22	-0.85	-15.74	
6,454.0	1.70	230.10	5,896.1	-1,190.0	-2,114.5	2,426.2	0.96	-0.87	10.40	
6,548.0	0.70	164.20	5,990.1	-1,191.4	-2,115.4	2,427.7	1.65	-1.06	-70.11	
6,642.0	0.80	123.00	6,084.1	-1,192.3	-2,114.7	2,427.5	0.57	0.11	-43.83	
6,736.0	0.70	99.50	6,178.1	-1,192.8	-2,113.6	2,426.8	0.34	-0.11	-25.00	
6,831.0	0.40	108.50	6,273.1	-1,193.0	-2,112.7	2,426.1	0.33	-0.32	9.47	
6,925.0	0.40	328.50	6,367.1	-1,192.8	-2,112.6	2,425.9	0.80	0.00	-148.94	
7,019.0	0.10	68.10	6,461.1	-1,192.5	-2,112.7	2,425.8	0.46	-0.32	105.96	
7,082.0	0.40	279.50	6,524.1	-1,192.4	-2,112.8	2,425.9	0.77	0.48	-235.87	
7,176.0	1.00	220.50	6,618.1	-1,193.0	-2,113.7	2,427.0	0.92	0.64	-62.77	
7,270.0	1.70	238.40	6,712.0	-1,194.3	-2,115.4	2,429.1	0.86	0.74	19.04	
7,364.0	1.50	264.80	6,806.0	-1,195.2	-2,117.8	2,431.6	0.80	-0.21	28.09	
7,458.0	1.50	265.80	6,900.0	-1,195.4	-2,120.3	2,433.9	0.03	0.00	1.06	
7,553.0	1.90	257.60	6,994.9	-1,195.8	-2,123.0	2,436.5	0.49	0.42	-8.63	
7,647.0	2.30	257.50	7,088.9	-1,196.6	-2,126.4	2,439.8	0.43	0.43	-0.11	
7,741.0	3.20	248.00	7,182.8	-1,197.9	-2,130.7	2,444.2	1.07	0.96	-10.11	
7,835.0	2.40	250.10	7,276.6	-1,199.6	-2,135.0	2,448.7	0.86	-0.85	2.23	
7,929.0	2.30	254.40	7,370.6	-1,200.8	-2,138.6	2,452.5	0.22	-0.11	4.57	
8,024.0	2.50	259.80	7,465.5	-1,201.7	-2,142.5	2,456.3	0.32	0.21	5.68	
8,118.0	2.90	250.40	7,559.4	-1,202.8	-2,146.8	2,460.5	0.63	0.43	-10.00	
8,135.0	2.60	256.20	7,576.4	-1,203.1	-2,147.5	2,461.3	2.40	-1.76	34.12	
Projection to TD @ 8195.0' MD / 7636.3' TVD										
8,195.0	2.61	256.20	7,636.3	-1,203.7	-2,150.2	2,463.9	0.02	0.02	0.00	



Survey Report



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Well:	Bruton 30-16W	North Reference:	True
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Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
111.0	111.0	-0.7	-1.2	First MWD Survey @ 111.0' MD / 111.0' TVD
8,195.0	7,636.3	-1,203.7	-2,150.2	Projection to TD @ 8195.0' MD / 7636.3' TVD

Checked By: _____ Approved By: _____ Date: _____