



Laramie Energy, LLC

Mesa County, CO

Bruton 30-10 Pad

Bruton 30-15W

A-7

Design: A-7

QES Survey Report

22 December, 2017





Survey Report



Company:	Laramie Energy, LLC	Local Co-ordinate Reference:	Well Bruton 30-15W
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 30-15W	North Reference:	True
Wellbore:	A-7	Survey Calculation Method:	Minimum Curvature
Design:	A-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 30-15W					
Well Position	+N/-S	0.0 usft	Northing:	1,523,582.96 usft	Latitude:	39.248153
	+E/-W	0.0 usft	Easting:	2,346,198.02 usft	Longitude:	-107.808919
Position Uncertainty		0.0 usft	Wellhead Elevation:	0.0 usft	Ground Level:	7,643.0 usft

Wellbore	A-7				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	11/22/2017	9.54	65.41	51,357.72801241

Design	A-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	244.33	

Survey Program	Date	12/22/2017			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
111.0	8,225.0	QES MWD Surveys (A-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 @ 111.0' MD / 111.0' TVD										
111.0	1.30	217.00	111.0	-1.0	-0.8	1.1	1.17	1.17	0.00	
202.0	1.30	192.90	202.0	-2.8	-1.6	2.7	0.60	0.00	-26.48	
293.0	1.50	244.40	292.9	-4.4	-2.9	4.5	1.35	0.22	56.59	
384.0	2.70	273.30	383.9	-4.7	-6.1	7.6	1.72	1.32	31.76	
476.0	5.10	268.20	475.7	-4.8	-12.4	13.2	2.63	2.61	-5.54	
567.0	7.20	253.50	566.1	-6.5	-21.9	22.5	2.87	2.31	-16.15	
658.0	10.20	222.90	656.1	-14.0	-32.9	35.7	5.95	3.30	-33.63	
749.0	11.20	234.40	745.6	-25.1	-45.5	51.9	2.59	1.10	12.64	
840.0	13.80	242.30	834.4	-35.3	-62.3	71.5	3.41	2.86	8.68	



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Wellbore:	A-7	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	15.60	242.70	922.4	-45.9	-82.8	94.5	1.98	1.98	0.44
1,022.0	18.10	245.50	1,009.5	-57.4	-106.5	120.9	2.89	2.75	3.08
1,117.0	21.90	248.20	1,098.8	-70.1	-136.4	153.3	4.12	4.00	2.84
1,211.0	25.50	246.80	1,184.8	-84.6	-171.3	191.1	3.88	3.83	-1.49
1,305.0	27.80	248.20	1,268.8	-100.7	-210.3	233.2	2.54	2.45	1.49
1,399.0	29.80	246.60	1,351.2	-118.1	-252.1	278.4	2.28	2.13	-1.70
1,493.0	29.50	244.70	1,432.9	-137.3	-294.4	324.9	1.05	-0.32	-2.02
1,506.0	29.70	244.00	1,444.2	-140.1	-300.2	331.3	3.07	1.54	-5.38
1,617.0	29.90	244.90	1,540.5	-163.9	-350.0	386.4	0.44	0.18	0.81
1,711.0	29.00	245.00	1,622.4	-183.4	-391.9	432.6	0.96	-0.96	0.11
1,805.0	27.90	242.70	1,705.0	-203.1	-432.1	477.4	1.65	-1.17	-2.45
1,899.0	28.30	245.90	1,787.9	-222.3	-471.9	521.7	1.66	0.43	3.40
1,993.0	28.30	243.30	1,870.7	-241.4	-512.2	566.2	1.31	0.00	-2.77
2,088.0	29.40	244.60	1,953.9	-261.6	-553.4	612.1	1.33	1.16	1.37
2,182.0	28.30	244.50	2,036.3	-281.1	-594.3	657.4	1.17	-1.17	-0.11
2,276.0	29.60	246.20	2,118.5	-300.0	-635.7	702.9	1.64	1.38	1.81
2,370.0	28.20	244.90	2,200.8	-318.8	-677.0	748.3	1.63	-1.49	-1.38
2,464.0	28.80	247.90	2,283.4	-336.8	-718.1	793.1	1.65	0.64	3.19
2,558.0	27.60	245.20	2,366.3	-354.4	-758.9	837.5	1.86	-1.28	-2.87
2,652.0	28.60	247.20	2,449.2	-372.3	-799.4	881.8	1.46	1.06	2.13
2,747.0	27.60	248.30	2,533.0	-389.2	-840.8	926.4	1.19	-1.05	1.16
2,841.0	27.50	245.20	2,616.3	-406.4	-880.7	969.8	1.53	-0.11	-3.30
2,935.0	26.10	243.20	2,700.2	-424.8	-918.9	1,012.2	1.77	-1.49	-2.13
3,029.0	27.10	243.70	2,784.3	-443.6	-956.5	1,054.3	1.09	1.06	0.53
3,124.0	28.70	246.20	2,868.2	-462.4	-996.8	1,098.7	2.09	1.68	2.63
3,218.0	27.60	247.20	2,951.1	-479.9	-1,037.5	1,143.1	1.27	-1.17	1.06
3,312.0	27.00	247.20	3,034.6	-496.6	-1,077.3	1,186.1	0.64	-0.64	0.00
3,407.0	28.80	243.80	3,118.6	-515.1	-1,117.7	1,230.5	2.53	1.89	-3.58
3,501.0	28.00	242.70	3,201.3	-535.2	-1,157.6	1,275.2	1.02	-0.85	-1.17
3,595.0	26.80	242.30	3,284.7	-555.2	-1,196.0	1,318.5	1.29	-1.28	-0.43
3,689.0	28.20	243.70	3,368.1	-574.9	-1,234.7	1,361.9	1.64	1.49	1.49
3,783.0	28.90	245.40	3,450.7	-594.2	-1,275.2	1,406.8	1.14	0.74	1.81
3,878.0	27.90	246.00	3,534.3	-612.8	-1,316.4	1,452.0	1.09	-1.05	0.63
3,972.0	27.00	245.40	3,617.7	-630.6	-1,355.9	1,495.3	1.00	-0.96	-0.64
4,066.0	26.30	244.90	3,701.7	-648.3	-1,394.2	1,537.4	0.78	-0.74	-0.53
4,161.0	27.30	244.30	3,786.5	-666.7	-1,432.9	1,580.3	1.09	1.05	-0.63
4,255.0	28.80	244.40	3,869.4	-685.8	-1,472.7	1,624.5	1.60	1.60	0.11
4,349.0	28.30	242.50	3,952.0	-705.9	-1,512.9	1,669.4	1.10	-0.53	-2.02
4,443.0	27.10	243.20	4,035.2	-725.9	-1,551.8	1,713.1	1.32	-1.28	0.74
4,537.0	28.70	241.40	4,118.3	-746.3	-1,590.7	1,757.0	1.92	1.70	-1.91
4,631.0	27.38	241.13	4,201.3	-767.6	-1,629.5	1,801.1	1.41	-1.40	-0.29
4,726.0	26.80	239.60	4,285.9	-788.9	-1,667.1	1,844.3	0.95	-0.61	-1.61
4,821.0	26.45	245.35	4,370.8	-808.6	-1,704.8	1,886.8	2.74	-0.37	6.05



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Survey									
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4,915.0	24.80	244.91	4,455.5	-825.7	-1,741.6	1,927.4	1.77	-1.76	-0.47
5,009.0	23.80	242.10	4,541.2	-842.9	-1,776.3	1,966.1	1.63	-1.06	-2.99
5,103.0	22.60	243.00	4,627.6	-860.0	-1,809.1	2,003.1	1.33	-1.28	0.96
5,198.0	21.80	242.80	4,715.6	-876.4	-1,841.1	2,039.0	0.85	-0.84	-0.21
5,292.0	21.09	241.40	4,803.1	-892.4	-1,871.5	2,073.3	0.93	-0.76	-1.49
5,386.0	19.78	240.08	4,891.1	-908.5	-1,900.1	2,106.1	1.48	-1.39	-1.40
5,480.0	18.90	239.02	4,979.8	-924.2	-1,926.9	2,137.1	1.01	-0.94	-1.13
5,574.0	17.40	238.80	5,069.2	-939.4	-1,952.0	2,166.3	1.60	-1.60	-0.23
5,668.0	16.60	237.60	5,159.1	-953.8	-1,975.4	2,193.6	0.93	-0.85	-1.28
5,763.0	14.90	242.30	5,250.5	-966.8	-1,997.6	2,219.3	2.24	-1.79	4.95
5,857.0	12.50	243.20	5,341.8	-977.0	-2,017.4	2,241.5	2.56	-2.55	0.96
5,951.0	9.60	249.90	5,434.1	-984.3	-2,033.9	2,259.5	3.37	-3.09	7.13
6,045.0	6.90	254.70	5,527.1	-988.4	-2,046.7	2,272.9	2.96	-2.87	5.11
6,140.0	4.00	266.40	5,621.6	-990.2	-2,055.5	2,281.5	3.25	-3.05	12.32
6,234.0	1.90	277.70	5,715.5	-990.2	-2,060.3	2,285.9	2.31	-2.23	12.02
6,328.0	1.90	277.80	5,809.5	-989.7	-2,063.4	2,288.5	0.00	0.00	0.11
6,422.0	1.90	249.50	5,903.4	-990.1	-2,066.4	2,291.3	0.99	0.00	-30.11
6,517.0	0.40	348.30	5,998.4	-990.3	-2,067.9	2,292.8	2.11	-1.58	104.00
6,611.0	0.40	264.80	6,092.4	-990.0	-2,068.3	2,293.1	0.57	0.00	-88.83
6,705.0	1.00	192.80	6,186.4	-990.8	-2,068.8	2,293.9	1.02	0.64	-76.60
6,799.0	1.30	229.70	6,280.4	-992.3	-2,069.8	2,295.4	0.83	0.32	39.26
6,893.0	1.20	201.20	6,374.3	-993.9	-2,071.0	2,297.2	0.66	-0.11	-30.32
6,987.0	1.80	229.10	6,468.3	-995.8	-2,072.5	2,299.3	0.99	0.64	29.68
7,081.0	2.30	228.50	6,562.3	-998.0	-2,075.0	2,302.5	0.53	0.53	-0.64
7,176.0	1.80	211.50	6,657.2	-1,000.6	-2,077.2	2,305.6	0.82	-0.53	-17.89
7,270.0	2.10	220.60	6,751.1	-1,003.1	-2,079.1	2,308.4	0.46	0.32	9.68
7,364.0	2.50	219.10	6,845.1	-1,006.0	-2,081.5	2,311.9	0.43	0.43	-1.60
7,458.0	2.60	215.60	6,939.0	-1,009.4	-2,084.0	2,315.6	0.20	0.11	-3.72
7,552.0	2.70	215.20	7,032.9	-1,012.9	-2,086.6	2,319.4	0.11	0.11	-0.43
7,646.0	2.70	235.30	7,126.8	-1,016.0	-2,089.7	2,323.5	1.00	0.00	21.38
7,740.0	2.99	240.00	7,220.7	-1,018.5	-2,093.6	2,328.2	0.40	0.31	5.00
7,835.0	3.20	229.00	7,315.5	-1,021.4	-2,097.8	2,333.2	0.66	0.22	-11.58
7,929.0	3.50	235.30	7,409.4	-1,024.8	-2,102.1	2,338.6	0.50	0.32	6.70
8,023.0	3.50	228.00	7,503.2	-1,028.3	-2,106.6	2,344.1	0.47	0.00	-7.77
8,118.0	2.90	233.00	7,598.0	-1,031.7	-2,110.7	2,349.3	0.70	-0.63	5.26
8,165.0	3.00	227.80	7,645.0	-1,033.3	-2,112.5	2,351.6	0.61	0.21	-11.06
Projection to TD @ 8225.0' MD / 7704.9' TVD									
8,225.0	3.00	227.80	7,704.9	-1,035.4	-2,114.8	2,354.6	0.00	0.00	0.00



Survey Report



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Wellbore:	A-7	Survey Calculation Method:	Minimum Curvature
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Design Annotations

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		+N/-S (usft)	+E/-W (usft)	
111.0	111.0	-1.0	-0.8	First MWD Survey @ 111.0' MD / 111.0' TVD
8,225.0	7,704.9	-1,035.4	-2,114.8	Projection to TD @ 8225.0' MD / 7704.9' TVD

Checked By: _____ Approved By: _____ Date: _____