



Laramie Energy, LLC

Garfield County, CO

CC 0697-03-07 Pad

CC 0697-03-17E

ST01

Plan: ST01 D#1

QES Well Planning Report

08 August, 2018





Well Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well CC 0697-03-17E
Company:	Laramie Energy, LLC	TVD Reference:	well @ 8458.0usft (30' RKB)
Project:	Garfield County, CO	MD Reference:	well @ 8458.0usft (30' RKB)
Site:	CC 0697-03-07 Pad	North Reference:	True
Well:	CC 0697-03-17E	Survey Calculation Method:	Minimum Curvature
Wellbore:	ST01		
Design:	ST01 D#1		

Project	Garfield 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		CC 0697-03-07 Pad				
Site Position:		Northing:	1,638,132.66 usft	Latitude:	39.554247	
From:	Lat/Long	Easting:	2,236,874.96 usft	Longitude:	-108.206835	
Position Uncertainty:		0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	-1.71 °

Well	CC 0697-03-17E					
Well Position	+N/-S	1,445.5 usft	Northing:	1,639,563.15 usft	Latitude:	39.558215
	+E/-W	480.8 usft	Easting:	2,237,398.62 usft	Longitude:	-108.205130
Position Uncertainty	0.0 usft		Wellhead Elevation:		Ground Level:	8,428.0 usft

Wellbore	ST01				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	8/8/2018	9.68	65.58	51,389.14475951

Design	ST01 D#1				
Audit Notes:					
Version:	Phase:	PLAN	Tie On Depth:	3,181.0	
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)	
	0.0	0.0	0.0	151.71	

Plan Sections										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target
3,181.0	17.50	146.20	3,034.0	-749.7	435.8	0.00	0.00	0.00	0.00	
3,281.0	17.50	146.20	3,129.4	-774.7	452.6	0.00	0.00	0.00	0.00	
3,527.8	18.60	170.00	3,364.4	-844.4	480.1	3.00	0.45	9.64	92.97	
4,600.0	18.60	170.00	4,380.5	-1,181.2	539.5	0.00	0.00	0.00	0.00	
4,861.6	18.61	145.22	4,628.9	-1,256.7	570.6	3.00	0.00	-9.47	-101.69	
7,133.0	18.61	145.22	6,781.5	-1,852.1	984.0	0.00	0.00	0.00	0.00	
7,753.4	0.00	0.00	7,391.0	-1,934.1	1,041.0	3.00	-3.00	0.00	180.00	
10,472.4	0.00	0.00	10,110.0	-1,934.1	1,041.0	0.00	0.00	0.00	0.00	PBHL - CC 0697-03



Well Planning Report



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Company:	Laramie Energy, LLC	TVD Reference:	well @ 8458.0usft (30' RKB)
Project:	Garfield County, CO	MD Reference:	well @ 8458.0usft (30' RKB)
Site:	CC 0697-03-07 Pad	North Reference:	True
Well:	CC 0697-03-17E	Survey Calculation Method:	Minimum Curvature
Wellbore:	ST01		
Design:	ST01 D#1		

Planned 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
315.0	3.50	176.60	314.8	-9.6	0.6	8.7	1.11	1.11	0.00
408.0	4.90	173.20	407.6	-16.4	1.2	15.0	1.53	1.51	-3.66
499.0	6.20	160.10	498.1	-24.9	3.3	23.5	1.99	1.43	-14.40
590.0	7.70	145.90	588.5	-34.5	8.4	34.4	2.49	1.65	-15.60
681.0	9.80	145.50	678.4	-46.0	16.2	48.2	2.31	2.31	-0.44
771.0	11.40	146.30	766.9	-59.7	25.5	64.6	1.79	1.78	0.89
862.0	13.10	156.70	855.8	-76.6	34.6	83.9	3.05	1.87	11.43
953.0	15.70	157.80	943.9	-97.5	43.3	106.4	2.87	2.86	1.21
1,044.0	18.50	152.40	1,030.9	-121.7	54.7	133.1	3.53	3.08	-5.93
1,138.0	22.30	151.00	1,119.0	-150.5	70.2	165.8	4.08	4.04	-1.49
1,233.0	23.40	144.40	1,206.6	-181.6	89.9	202.6	2.93	1.16	-6.95
1,327.0	27.50	149.80	1,291.4	-215.6	111.7	242.8	5.01	4.36	5.74
1,422.0	27.10	149.50	1,375.8	-253.2	133.8	286.3	0.45	-0.42	-0.32
1,516.0	25.40	148.70	1,460.1	-288.9	155.1	327.9	1.85	-1.81	-0.85
1,610.0	22.70	146.40	1,546.0	-321.2	175.6	366.1	3.04	-2.87	-2.45
1,706.0	22.20	148.80	1,634.7	-352.2	195.3	402.6	1.09	-0.52	2.50
1,800.0	20.70	147.30	1,722.2	-381.3	213.4	436.9	1.70	-1.60	-1.60
1,895.0	18.30	150.00	1,811.7	-408.4	230.0	468.6	2.70	-2.53	2.84
1,989.0	16.70	153.20	1,901.4	-433.2	243.4	496.8	1.99	-1.70	3.40
2,084.0	17.50	152.10	1,992.2	-458.0	256.3	524.8	0.91	0.84	-1.16
2,178.0	18.10	153.70	2,081.7	-483.6	269.4	553.5	0.82	0.64	1.70
2,273.0	18.10	151.40	2,172.0	-509.8	283.0	583.0	0.75	0.00	-2.42
2,367.0	17.10	146.50	2,261.6	-534.1	297.6	611.4	1.90	-1.06	-5.21
2,463.0	18.40	145.50	2,353.0	-558.4	313.9	640.5	1.39	1.35	-1.04
2,525.0	19.60	144.00	2,411.6	-574.9	325.6	660.5	2.09	1.94	-2.42
2,613.0	16.10	141.50	2,495.4	-596.4	341.9	687.2	4.07	-3.98	-2.84
2,708.0	17.10	145.80	2,586.4	-618.2	357.9	714.0	1.67	1.05	4.53
2,802.0	19.50	151.20	2,675.7	-643.4	373.3	743.5	3.12	2.55	5.74
2,897.0	19.80	150.40	2,765.1	-671.3	388.8	775.4	0.42	0.32	-0.84
2,992.0	19.50	150.20	2,854.6	-699.0	404.7	807.3	0.32	-0.32	-0.21
3,087.0	18.20	148.50	2,944.5	-725.5	420.3	838.0	1.49	-1.37	-1.79
Tie into MWD Survey									
3,181.0	17.50	146.20	3,034.0	-749.7	435.8	866.7	1.06	-0.74	-2.45
3,200.0	17.50	146.20	3,052.1	-754.5	439.0	872.4	0.00	0.00	0.00
Build 3° / 100'									
3,281.0	17.50	146.20	3,129.4	-774.7	452.6	896.7	0.00	0.00	0.00
3,300.0	17.48	148.10	3,147.5	-779.5	455.7	902.4	3.00	-0.11	9.98
3,400.0	17.67	158.02	3,242.8	-806.3	469.3	932.4	3.00	0.19	9.93
3,500.0	18.33	167.50	3,338.0	-835.8	478.4	962.7	3.00	0.67	9.48
EOB @ 18.60° Inc. / 170.00° Azm									
3,527.8	18.60	170.00	3,364.4	-844.4	480.1	971.1	3.00	0.95	8.98
3,600.0	18.60	170.00	3,432.8	-867.1	484.1	992.9	0.00	0.00	0.00
3,700.0	18.60	170.00	3,527.5	-898.5	489.6	1,023.2	0.00	0.00	0.00
3,800.0	18.60	170.00	3,622.3	-929.9	495.2	1,053.5	0.00	0.00	0.00
3,900.0	18.60	170.00	3,717.1	-961.3	500.7	1,083.8	0.00	0.00	0.00
4,000.0	18.60	170.00	3,811.9	-992.7	506.2	1,114.1	0.00	0.00	0.00
4,100.0	18.60	170.00	3,906.7	-1,024.1	511.8	1,144.4	0.00	0.00	0.00
4,200.0	18.60	170.00	4,001.4	-1,055.5	517.3	1,174.6	0.00	0.00	0.00
4,300.0	18.60	170.00	4,096.2	-1,087.0	522.9	1,204.9	0.00	0.00	0.00
4,400.0	18.60	170.00	4,191.0	-1,118.4	528.4	1,235.2	0.00	0.00	0.00
4,500.0	18.60	170.00	4,285.8	-1,149.8	533.9	1,265.5	0.00	0.00	0.00
Turn 3° / 100'									
4,600.0	18.60	170.00	4,380.5	-1,181.2	539.5	1,295.8	0.00	0.00	0.00



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Well:	CC 0697-03-17E	Survey Calculation Method:	Minimum Curvature
Wellbore:	ST01		
Design:	ST01 D#1		

Planned 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)
4,700.0	18.22	160.57	4,475.4	-1,211.6	547.4	1,326.4	3.00	-0.38	-9.43
4,800.0	18.32	150.99	4,570.4	-1,240.1	560.3	1,357.6	3.00	0.10	-9.58
EOB @ 145.23° Azm									
4,861.6	18.61	145.22	4,628.9	-1,256.7	570.6	1,377.0	3.00	0.47	-9.36
4,900.0	18.61	145.22	4,665.2	-1,266.7	577.6	1,389.2	0.00	0.00	0.00
5,000.0	18.61	145.22	4,760.0	-1,293.0	595.8	1,420.9	0.00	0.00	0.00
5,100.0	18.61	145.22	4,854.8	-1,319.2	614.0	1,452.6	0.00	0.00	0.00
5,200.0	18.61	145.22	4,949.6	-1,345.4	632.2	1,484.3	0.00	0.00	0.00
5,300.0	18.61	145.22	5,044.3	-1,371.6	650.4	1,516.0	0.00	0.00	0.00
5,400.0	18.61	145.22	5,139.1	-1,397.8	668.6	1,547.7	0.00	0.00	0.00
5,500.0	18.61	145.22	5,233.9	-1,424.0	686.8	1,579.4	0.00	0.00	0.00
5,600.0	18.61	145.22	5,328.6	-1,450.2	705.0	1,611.1	0.00	0.00	0.00
5,700.0	18.61	145.22	5,423.4	-1,476.4	723.2	1,642.8	0.00	0.00	0.00
5,800.0	18.61	145.22	5,518.2	-1,502.7	741.4	1,674.5	0.00	0.00	0.00
5,900.0	18.61	145.22	5,613.0	-1,528.9	759.6	1,706.3	0.00	0.00	0.00
6,000.0	18.61	145.22	5,707.7	-1,555.1	777.8	1,738.0	0.00	0.00	0.00
6,100.0	18.61	145.22	5,802.5	-1,581.3	796.0	1,769.7	0.00	0.00	0.00
6,200.0	18.61	145.22	5,897.3	-1,607.5	814.2	1,801.4	0.00	0.00	0.00
6,300.0	18.61	145.22	5,992.0	-1,633.7	832.4	1,833.1	0.00	0.00	0.00
6,400.0	18.61	145.22	6,086.8	-1,659.9	850.6	1,864.8	0.00	0.00	0.00
6,500.0	18.61	145.22	6,181.6	-1,686.1	868.8	1,896.5	0.00	0.00	0.00
6,600.0	18.61	145.22	6,276.4	-1,712.4	887.0	1,928.2	0.00	0.00	0.00
6,700.0	18.61	145.22	6,371.1	-1,738.6	905.2	1,959.9	0.00	0.00	0.00
6,800.0	18.61	145.22	6,465.9	-1,764.8	923.4	1,991.6	0.00	0.00	0.00
6,900.0	18.61	145.22	6,560.7	-1,791.0	941.6	2,023.3	0.00	0.00	0.00
7,000.0	18.61	145.22	6,655.4	-1,817.2	959.8	2,055.0	0.00	0.00	0.00
7,100.0	18.61	145.22	6,750.2	-1,843.4	978.0	2,086.7	0.00	0.00	0.00
Drop 3° / 100'									
7,133.0	18.61	145.22	6,781.5	-1,852.1	984.0	2,097.2	0.00	0.00	0.00
7,200.0	16.60	145.22	6,845.4	-1,868.7	995.5	2,117.3	3.00	-3.00	0.00
7,300.0	13.60	145.22	6,941.9	-1,890.1	1,010.4	2,143.2	3.00	-3.00	0.00
7,400.0	10.60	145.22	7,039.7	-1,907.3	1,022.4	2,164.0	3.00	-3.00	0.00
7,500.0	7.60	145.22	7,138.4	-1,920.3	1,031.4	2,179.8	3.00	-3.00	0.00
7,600.0	4.60	145.22	7,237.8	-1,929.0	1,037.4	2,190.3	3.00	-3.00	0.00
7,700.0	1.60	145.22	7,337.6	-1,933.5	1,040.5	2,195.7	3.00	-3.00	0.00
EOD @ Vertical									
7,753.4	0.00	0.00	7,391.0	-1,934.1	1,041.0	2,196.4	3.00	-3.00	0.00
7,800.0	0.00	0.00	7,437.6	-1,934.1	1,041.0	2,196.4	0.00	0.00	0.00
7,900.0	0.00	0.00	7,537.6	-1,934.1	1,041.0	2,196.4	0.00	0.00	0.00
8,000.0	0.00	0.00	7,637.6	-1,934.1	1,041.0	2,196.4	0.00	0.00	0.00
8,100.0	0.00	0.00	7,737.6	-1,934.1	1,041.0	2,196.4	0.00	0.00	0.00
8,200.0	0.00	0.00	7,837.6	-1,934.1	1,041.0	2,196.4	0.00	0.00	0.00
8,300.0	0.00	0.00	7,937.6	-1,934.1	1,041.0	2,196.4	0.00	0.00	0.00
8,400.0	0.00	0.00	8,037.6	-1,934.1	1,041.0	2,196.4	0.00	0.00	0.00
8,500.0	0.00	0.00	8,137.6	-1,934.1	1,041.0	2,196.4	0.00	0.00	0.00
8,600.0	0.00	0.00	8,237.6	-1,934.1	1,041.0	2,196.4	0.00	0.00	0.00
8,700.0	0.00	0.00	8,337.6	-1,934.1	1,041.0	2,196.4	0.00	0.00	0.00
8,800.0	0.00	0.00	8,437.6	-1,934.1	1,041.0	2,196.4	0.00	0.00	0.00
8,900.0	0.00	0.00	8,537.6	-1,934.1	1,041.0	2,196.4	0.00	0.00	0.00
9,000.0	0.00	0.00	8,637.6	-1,934.1	1,041.0	2,196.4	0.00	0.00	0.00
9,100.0	0.00	0.00	8,737.6	-1,934.1	1,041.0	2,196.4	0.00	0.00	0.00
9,200.0	0.00	0.00	8,837.6	-1,934.1	1,041.0	2,196.4	0.00	0.00	0.00
9,300.0	0.00	0.00	8,937.6	-1,934.1	1,041.0	2,196.4	0.00	0.00	0.00



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Site:	CC 0697-03-07 Pad	North Reference:	True
Well:	CC 0697-03-17E	Survey Calculation Method:	Minimum Curvature
Wellbore:	ST01		
Design:	ST01 D#1		

Planned 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)
9,400.0	0.00	0.00	9,037.6	-1,934.1	1,041.0	2,196.4	0.00	0.00	0.00
9,500.0	0.00	0.00	9,137.6	-1,934.1	1,041.0	2,196.4	0.00	0.00	0.00
9,600.0	0.00	0.00	9,237.6	-1,934.1	1,041.0	2,196.4	0.00	0.00	0.00
9,700.0	0.00	0.00	9,337.6	-1,934.1	1,041.0	2,196.4	0.00	0.00	0.00
9,800.0	0.00	0.00	9,437.6	-1,934.1	1,041.0	2,196.4	0.00	0.00	0.00
9,900.0	0.00	0.00	9,537.6	-1,934.1	1,041.0	2,196.4	0.00	0.00	0.00
10,000.0	0.00	0.00	9,637.6	-1,934.1	1,041.0	2,196.4	0.00	0.00	0.00
10,100.0	0.00	0.00	9,737.6	-1,934.1	1,041.0	2,196.4	0.00	0.00	0.00
10,200.0	0.00	0.00	9,837.6	-1,934.1	1,041.0	2,196.4	0.00	0.00	0.00
10,300.0	0.00	0.00	9,937.6	-1,934.1	1,041.0	2,196.4	0.00	0.00	0.00
10,400.0	0.00	0.00	10,037.6	-1,934.1	1,041.0	2,196.4	0.00	0.00	0.00
TD @ 10472.4' MD / 10110.0' TVD									
10,472.4	0.00	0.00	10,110.0	-1,934.1	1,041.0	2,196.4	0.00	0.00	0.00

Design Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
- hit/miss target									
- Shape									
PBHL - CC 0697-03-1	0.00	0.00	10,110.0	-1,934.1	1,041.0	1,637,598.92	2,238,381.53	39.552905	-108.201438
- plan hits target center									
- Circle (radius 87.5)									

Plan Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
3,181.0	3,034.0	-749.7	435.8	Tie into MWD Survey
3,281.0	3,129.4	-774.7	452.6	Build 3° / 100'
3,527.8	3,364.4	-844.4	480.1	EOB @ 18.60° Inc. / 170.00° Azm
4,600.0	4,380.5	-1,181.2	539.5	Turn 3° / 100'
4,861.6	4,628.9	-1,256.7	570.6	EOB @ 145.23° Azm
7,133.0	6,781.5	-1,852.1	984.0	Drop 3° / 100'
7,753.4	7,391.0	-1,934.1	1,041.0	EOD @ Vertical
10,472.4	10,110.0	-1,934.1	1,041.0	TD @ 10472.4' MD / 10110.0' TVD