



Laramie Energy, LLC

Garfield County, CO

CC 0697-03-07 Pad

CC 0697-03-09E

A-4

Plan: Design #4

QES Well Planning Report

08 April, 2019





Well Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well CC 0697-03-09E
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 0697-03-09E	Survey Calculation Method:	Minimum Curvature
Wellbore:	A-4		
Design:	Design #4		

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 0697-03-09E					
Well Position	+N/-S	1,524.4 usft	Northing:	1,639,641.64 usft	Latitude:	39.558432
	+E/-W	494.3 usft	Easting:	2,237,414.42 usft	Longitude:	-108.205082
Position Uncertainty		0.0 usft	Wellhead Elevation:		Ground Level:	8,428.0 usft

Wellbore	A-4				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	4/2/2019	9.58	65.82	51,449.90000000

Design	Design #4			
Audit Notes:				
Version:	Phase:	PLAN	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.0	0.0	0.0	81.93

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
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00	0.00	
150.0	0.00	0.00	150.0	0.0	0.0	0.00	0.00	0.00	0.00	
883.7	14.67	81.93	875.7	13.1	92.5	2.00	2.00	0.00	81.93	
6,741.3	14.67	81.93	6,542.3	221.5	1,561.7	0.00	0.00	0.00	0.00	
7,475.1	0.00	0.00	7,268.0	234.6	1,654.2	2.00	-2.00	0.00	180.00	
10,455.1	0.00	0.00	10,248.0	234.6	1,654.2	0.00	0.00	0.00	0.00	PBHL - CC 0697-03



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Site:	CC 0697-03-07 Pad	North Reference:	True
Well:	CC 0697-03-09E	Survey Calculation Method:	Minimum Curvature
Wellbore:	A-4		
Design:	Design #4		

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
100.0	0.00	0.00	100.0	0.0	0.0	0.0	0.00	0.00	0.00
KOP (Build 2° / 100')									
150.0	0.00	0.00	150.0	0.0	0.0	0.0	0.00	0.00	0.00
200.0	1.00	81.93	200.0	0.1	0.4	0.4	2.00	2.00	0.00
300.0	3.00	81.93	299.9	0.6	3.9	3.9	2.00	2.00	0.00
400.0	5.00	81.93	399.7	1.5	10.8	10.9	2.00	2.00	0.00
500.0	7.00	81.93	499.1	3.0	21.1	21.4	2.00	2.00	0.00
600.0	9.00	81.93	598.2	5.0	34.9	35.3	2.00	2.00	0.00
700.0	11.00	81.93	696.6	7.4	52.1	52.6	2.00	2.00	0.00
800.0	13.00	81.93	794.4	10.3	72.7	73.4	2.00	2.00	0.00
EOB @ 14.67° Inc. / 81.93° Azm									
883.7	14.67	81.93	875.7	13.1	92.5	93.4	2.00	2.00	0.00
900.0	14.67	81.93	891.5	13.7	96.6	97.6	0.00	0.00	0.00
1,000.0	14.67	81.93	988.2	17.3	121.7	122.9	0.00	0.00	0.00
1,100.0	14.67	81.93	1,085.0	20.8	146.8	148.2	0.00	0.00	0.00
Mahogany									
1,135.2	14.67	81.93	1,119.0	22.1	155.6	157.2	0.00	0.00	0.00
1,200.0	14.67	81.93	1,181.7	24.4	171.8	173.6	0.00	0.00	0.00
1,300.0	14.67	81.93	1,278.4	27.9	196.9	198.9	0.00	0.00	0.00
1,400.0	14.67	81.93	1,375.2	31.5	222.0	224.2	0.00	0.00	0.00
1,500.0	14.67	81.93	1,471.9	35.0	247.1	249.6	0.00	0.00	0.00
1,600.0	14.67	81.93	1,568.6	38.6	272.2	274.9	0.00	0.00	0.00
1,700.0	14.67	81.93	1,665.4	42.2	297.3	300.2	0.00	0.00	0.00
1,800.0	14.67	81.93	1,762.1	45.7	322.3	325.6	0.00	0.00	0.00
1,900.0	14.67	81.93	1,858.9	49.3	347.4	350.9	0.00	0.00	0.00
2,000.0	14.67	81.93	1,955.6	52.8	372.5	376.2	0.00	0.00	0.00
2,100.0	14.67	81.93	2,052.3	56.4	397.6	401.6	0.00	0.00	0.00
2,200.0	14.67	81.93	2,149.1	60.0	422.7	426.9	0.00	0.00	0.00
2,300.0	14.67	81.93	2,245.8	63.5	447.7	452.2	0.00	0.00	0.00
2,400.0	14.67	81.93	2,342.5	67.1	472.8	477.6	0.00	0.00	0.00
2,500.0	14.67	81.93	2,439.3	70.6	497.9	502.9	0.00	0.00	0.00
9 5/8"									
2,530.0	14.67	81.93	2,468.3	71.7	505.4	510.5	0.00	0.00	0.00
2,600.0	14.67	81.93	2,536.0	74.2	523.0	528.2	0.00	0.00	0.00
2,700.0	14.67	81.93	2,632.8	77.7	548.1	553.5	0.00	0.00	0.00
2,800.0	14.67	81.93	2,729.5	81.3	573.1	578.9	0.00	0.00	0.00
2,900.0	14.67	81.93	2,826.2	84.9	598.2	604.2	0.00	0.00	0.00
3,000.0	14.67	81.93	2,923.0	88.4	623.3	629.5	0.00	0.00	0.00
3,100.0	14.67	81.93	3,019.7	92.0	648.4	654.9	0.00	0.00	0.00
Wasatch									
3,134.4	14.67	81.93	3,053.0	93.2	657.0	663.6	0.00	0.00	0.00
3,200.0	14.67	81.93	3,116.5	95.5	673.5	680.2	0.00	0.00	0.00
3,300.0	14.67	81.93	3,213.2	99.1	698.5	705.5	0.00	0.00	0.00
3,400.0	14.67	81.93	3,309.9	102.6	723.6	730.9	0.00	0.00	0.00
3,500.0	14.67	81.93	3,406.7	106.2	748.7	756.2	0.00	0.00	0.00
3,600.0	14.67	81.93	3,503.4	109.8	773.8	781.5	0.00	0.00	0.00
3,700.0	14.67	81.93	3,600.1	113.3	798.9	806.9	0.00	0.00	0.00
3,800.0	14.67	81.93	3,696.9	116.9	824.0	832.2	0.00	0.00	0.00
3,900.0	14.67	81.93	3,793.6	120.4	849.0	857.5	0.00	0.00	0.00
4,000.0	14.67	81.93	3,890.4	124.0	874.1	882.9	0.00	0.00	0.00
4,100.0	14.67	81.93	3,987.1	127.5	899.2	908.2	0.00	0.00	0.00
4,200.0	14.67	81.93	4,083.8	131.1	924.3	933.5	0.00	0.00	0.00
4,300.0	14.67	81.93	4,180.6	134.7	949.4	958.9	0.00	0.00	0.00



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Wellbore:	A-4		
Design:	Design #4		

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)
4,400.0	14.67	81.93	4,277.3	138.2	974.4	984.2	0.00	0.00	0.00
4,500.0	14.67	81.93	4,374.1	141.8	999.5	1,009.5	0.00	0.00	0.00
4,600.0	14.67	81.93	4,470.8	145.3	1,024.6	1,034.9	0.00	0.00	0.00
4,700.0	14.67	81.93	4,567.5	148.9	1,049.7	1,060.2	0.00	0.00	0.00
4,800.0	14.67	81.93	4,664.3	152.5	1,074.8	1,085.5	0.00	0.00	0.00
Wasatch 'G' Sand									
4,803.9	14.67	81.93	4,668.0	152.6	1,075.7	1,086.5	0.00	0.00	0.00
4,900.0	14.67	81.93	4,761.0	156.0	1,099.8	1,110.9	0.00	0.00	0.00
5,000.0	14.67	81.93	4,857.7	159.6	1,124.9	1,136.2	0.00	0.00	0.00
5,100.0	14.67	81.93	4,954.5	163.1	1,150.0	1,161.5	0.00	0.00	0.00
Fort Union									
5,192.5	14.67	81.93	5,044.0	166.4	1,173.2	1,185.0	0.00	0.00	0.00
5,200.0	14.67	81.93	5,051.2	166.7	1,175.1	1,186.8	0.00	0.00	0.00
5,300.0	14.67	81.93	5,148.0	170.2	1,200.2	1,212.2	0.00	0.00	0.00
5,400.0	14.67	81.93	5,244.7	173.8	1,225.2	1,237.5	0.00	0.00	0.00
5,500.0	14.67	81.93	5,341.4	177.4	1,250.3	1,262.8	0.00	0.00	0.00
5,600.0	14.67	81.93	5,438.2	180.9	1,275.4	1,288.2	0.00	0.00	0.00
5,700.0	14.67	81.93	5,534.9	184.5	1,300.5	1,313.5	0.00	0.00	0.00
5,800.0	14.67	81.93	5,631.6	188.0	1,325.6	1,338.8	0.00	0.00	0.00
5,900.0	14.67	81.93	5,728.4	191.6	1,350.7	1,364.2	0.00	0.00	0.00
6,000.0	14.67	81.93	5,825.1	195.1	1,375.7	1,389.5	0.00	0.00	0.00
6,100.0	14.67	81.93	5,921.9	198.7	1,400.8	1,414.8	0.00	0.00	0.00
6,200.0	14.67	81.93	6,018.6	202.3	1,425.9	1,440.2	0.00	0.00	0.00
6,300.0	14.67	81.93	6,115.3	205.8	1,451.0	1,465.5	0.00	0.00	0.00
6,400.0	14.67	81.93	6,212.1	209.4	1,476.1	1,490.8	0.00	0.00	0.00
6,500.0	14.67	81.93	6,308.8	212.9	1,501.1	1,516.2	0.00	0.00	0.00
6,600.0	14.67	81.93	6,405.6	216.5	1,526.2	1,541.5	0.00	0.00	0.00
6,700.0	14.67	81.93	6,502.3	220.0	1,551.3	1,566.8	0.00	0.00	0.00
Drop 2° / 100'									
6,741.3	14.67	81.93	6,542.3	221.5	1,561.7	1,577.3	0.00	0.00	0.00
Ohio Creek									
6,747.2	14.56	81.93	6,548.0	221.7	1,563.1	1,578.8	2.00	-2.00	0.00
6,800.0	13.50	81.93	6,599.2	223.5	1,575.8	1,591.6	2.00	-2.00	0.00
6,900.0	11.50	81.93	6,696.8	226.6	1,597.2	1,613.2	2.00	-2.00	0.00
Williams Fork									
6,936.9	10.76	81.93	6,733.0	227.6	1,604.3	1,620.3	2.00	-2.00	0.00
7,000.0	9.50	81.93	6,795.1	229.1	1,615.3	1,631.4	2.00	-2.00	0.00
7,100.0	7.50	81.93	6,894.0	231.2	1,629.9	1,646.2	2.00	-2.00	0.00
7,200.0	5.50	81.93	6,993.4	232.8	1,641.1	1,657.6	2.00	-2.00	0.00
7,300.0	3.50	81.93	7,093.1	233.9	1,648.9	1,665.4	2.00	-2.00	0.00
7,400.0	1.50	81.93	7,193.0	234.5	1,653.2	1,669.8	2.00	-2.00	0.00
EOD @ Vertical - TOG									
7,475.1	0.00	0.00	7,268.0	234.6	1,654.2	1,670.7	2.00	-2.00	-109.16
7,500.0	0.00	0.00	7,292.9	234.6	1,654.2	1,670.7	0.00	0.00	0.00
7,600.0	0.00	0.00	7,392.9	234.6	1,654.2	1,670.7	0.00	0.00	0.00
7,700.0	0.00	0.00	7,492.9	234.6	1,654.2	1,670.7	0.00	0.00	0.00
7,800.0	0.00	0.00	7,592.9	234.6	1,654.2	1,670.7	0.00	0.00	0.00
7,900.0	0.00	0.00	7,692.9	234.6	1,654.2	1,670.7	0.00	0.00	0.00
8,000.0	0.00	0.00	7,792.9	234.6	1,654.2	1,670.7	0.00	0.00	0.00
8,100.0	0.00	0.00	7,892.9	234.6	1,654.2	1,670.7	0.00	0.00	0.00
8,200.0	0.00	0.00	7,992.9	234.6	1,654.2	1,670.7	0.00	0.00	0.00
8,300.0	0.00	0.00	8,092.9	234.6	1,654.2	1,670.7	0.00	0.00	0.00
8,400.0	0.00	0.00	8,192.9	234.6	1,654.2	1,670.7	0.00	0.00	0.00



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Wellbore:	A-4		
Design:	Design #4		

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)
8,500.0	0.00	0.00	8,292.9	234.6	1,654.2	1,670.7	0.00	0.00	0.00
8,600.0	0.00	0.00	8,392.9	234.6	1,654.2	1,670.7	0.00	0.00	0.00
8,700.0	0.00	0.00	8,492.9	234.6	1,654.2	1,670.7	0.00	0.00	0.00
8,800.0	0.00	0.00	8,592.9	234.6	1,654.2	1,670.7	0.00	0.00	0.00
8,900.0	0.00	0.00	8,692.9	234.6	1,654.2	1,670.7	0.00	0.00	0.00
9,000.0	0.00	0.00	8,792.9	234.6	1,654.2	1,670.7	0.00	0.00	0.00
9,100.0	0.00	0.00	8,892.9	234.6	1,654.2	1,670.7	0.00	0.00	0.00
9,200.0	0.00	0.00	8,992.9	234.6	1,654.2	1,670.7	0.00	0.00	0.00
Cameo									
9,269.1	0.00	0.00	9,062.0	234.6	1,654.2	1,670.7	0.00	0.00	0.00
9,300.0	0.00	0.00	9,092.9	234.6	1,654.2	1,670.7	0.00	0.00	0.00
9,400.0	0.00	0.00	9,192.9	234.6	1,654.2	1,670.7	0.00	0.00	0.00
9,500.0	0.00	0.00	9,292.9	234.6	1,654.2	1,670.7	0.00	0.00	0.00
9,600.0	0.00	0.00	9,392.9	234.6	1,654.2	1,670.7	0.00	0.00	0.00
Base Cameo Coal									
9,665.1	0.00	0.00	9,458.0	234.6	1,654.2	1,670.7	0.00	0.00	0.00
Rollins									
9,675.1	0.00	0.00	9,468.0	234.6	1,654.2	1,670.7	0.00	0.00	0.00
9,700.0	0.00	0.00	9,492.9	234.6	1,654.2	1,670.7	0.00	0.00	0.00
9,800.0	0.00	0.00	9,592.9	234.6	1,654.2	1,670.7	0.00	0.00	0.00
9,900.0	0.00	0.00	9,692.9	234.6	1,654.2	1,670.7	0.00	0.00	0.00
Cozzette									
9,915.1	0.00	0.00	9,708.0	234.6	1,654.2	1,670.7	0.00	0.00	0.00
10,000.0	0.00	0.00	9,792.9	234.6	1,654.2	1,670.7	0.00	0.00	0.00
10,100.0	0.00	0.00	9,892.9	234.6	1,654.2	1,670.7	0.00	0.00	0.00
Corcoran									
10,155.1	0.00	0.00	9,948.0	234.6	1,654.2	1,670.7	0.00	0.00	0.00
10,200.0	0.00	0.00	9,992.9	234.6	1,654.2	1,670.7	0.00	0.00	0.00
10,300.0	0.00	0.00	10,092.9	234.6	1,654.2	1,670.7	0.00	0.00	0.00
10,400.0	0.00	0.00	10,192.9	234.6	1,654.2	1,670.7	0.00	0.00	0.00
TD @ 10455.1' MD / 10248.0' TVD									
10,455.1	0.00	0.00	10,248.0	234.6	1,654.2	1,670.7	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 0697-03-0	0.00	0.00	10,248.0	234.6	1,654.2	1,639,826.93	2,239,074.86	39.559076	-108.199215
- plan hits target center									
- Ellipse (radii L50.0 W75.0 on 150.00 azi)									

Casing Points					
Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")	
2,530.0	2,468.3	9 5/8"	9-5/8	14-3/4	



Well Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well CC 0697-03-09E
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 0697-03-09E	Survey Calculation Method:	Minimum Curvature
Wellbore:	A-4		
Design:	Design #4		

Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
1,135.2	1,119.0	Mahogany			
3,134.4	3,053.0	Wasatch			
4,803.9	4,668.0	Wasatch 'G' Sand			
5,192.5	5,044.0	Fort Union			
6,747.2	6,548.0	Ohio Creek			
6,936.9	6,733.0	Williams Fork			
7,475.1	7,268.0	TOG			
9,269.1	9,062.0	Cameo			
9,665.1	9,458.0	Base Cameo Coal			
9,675.1	9,468.0	Rollins			
9,915.1	9,708.0	Cozzette			
10,155.1	9,948.0	Corcoran			

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
150.0	150.0	0.0	0.0	KOP (Build 2° / 100')
883.7	875.7	13.1	92.5	EOB @ 14.67° Inc. / 81.93° Azm
6,741.3	6,542.3	221.5	1,561.7	Drop 2° / 100'
7,475.1	7,268.0	234.6	1,654.2	EOD @ Vertical
10,455.1	10,248.0	234.6	1,654.2	TD @ 10455.1' MD / 10248.0' TVD