

PROJECT DETAILS: Garfield County, CO

Geodetic System: US State Plane 1983
Datum: North American Datum 1983
Ellipsoid: GRS 1980
Zone: Colorado Central Zone
System Datum: Mean Sea Level

WELL DETAILS: CC 0697-03-12W

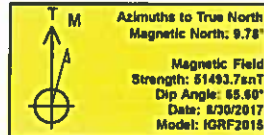
+N/-S 0.0 +E/-W 0.0 Northing 1639602.11 Easting 2237395.31 8428.0
Latitude 39.558322 Longitude -108.205142

Project: Garfield County, CO
Site: CC 0697-03-07 Pad
Well: CC 0697-03-12W
Wellbore: Wellbore #1
Design: Design #2
Latitude: 39.558322
Longitude: -108.205142
Ground Level: 8428.0
WELL @ 8458.0usft (30' RKB)



REFERENCE INFORMATION

Co-ordinate (N/E) Reference: Well CC 0697-03-12W, True North
Vertical (TVD) Reference: WELL @ 8458.0usft (30' RKB)
Section (VS) Reference: Slot - (0.0N, 0.0E)
Measured Depth Reference: WELL @ 8458.0usft (30' RKB)
Calculation Method: Minimum Curvature



FORMATION TOP DETAILS

TVDPath	MDPath	Formation
4498.0	4626.8	G' Sand
6598.0	6800.5	Williams Fork
7398.0	7616.9	TOG
8598.0	8816.9	Cameo
9258.0	9476.9	Base Cameo Coal
9298.0	9516.9	Rollins

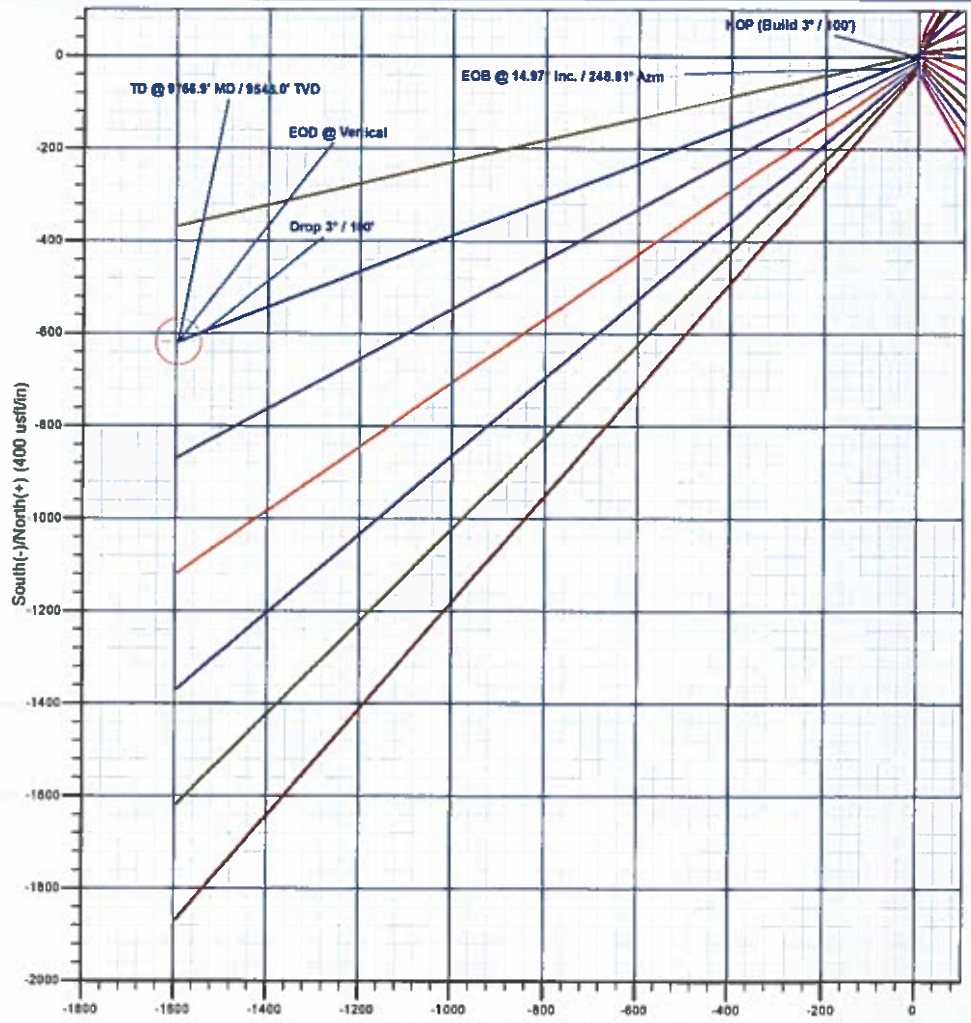
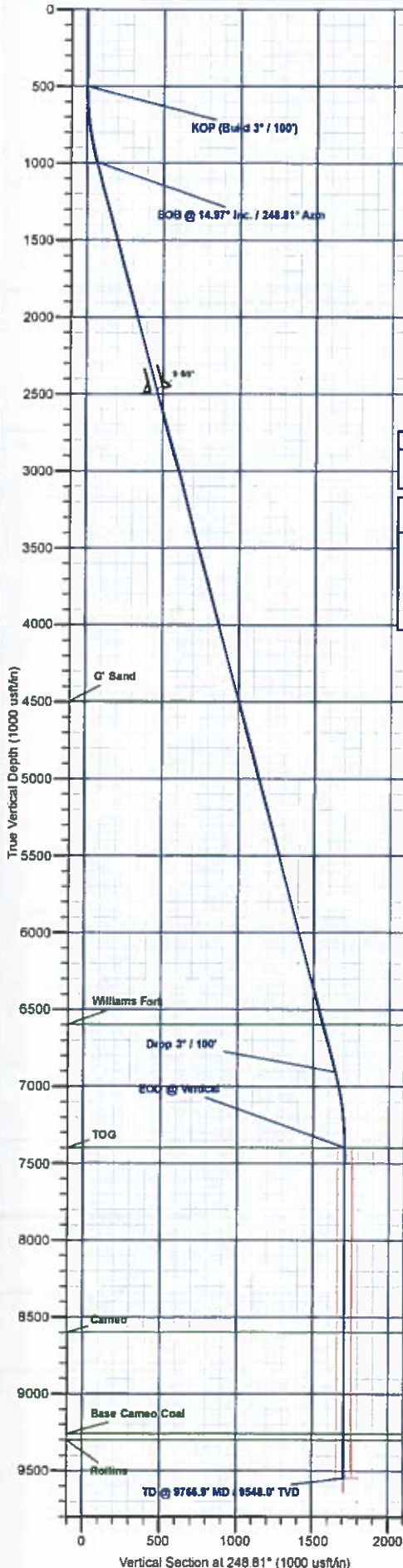


DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
PBHL - CC 0697-03-12W	9548.0	-616.1	-1594.5	1639601.78	2236784.15	39.556625	-108.210797

SECTION DETAILS

MD	Inc	Azi	TVD	+N/-S	+E/-W	Dieg	TFace	VSeet	Annotation
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	0.0
500.0	0.00	0.00	500.0	0.0	0.0	0.00	0.00	0.0	KOP (Build 3' / 100')
998.9	14.97	248.81	993.3	-23.4	-60.4	3.00	248.81	64.8	EOB @ 14.97° Inc. / 248.81° Azm
7118.0	14.97	248.81	6904.7	-594.6	-1534.0	0.00	0.00	1845.3	Drop 3' / 100'
7616.9	0.00	0.00	7398.0	-616.1	-1594.5	3.00	180.00	1710.1	EOB @ Vertical
9766.9	0.00	0.00	9548.0	-616.1	-1594.5	0.00	0.00	1710.1	TD @ 9766.9' MD / 9548.0' TVD



Plan: Design #2 (CC 0697-03-12W/Wellbore #1)

Created By: Will Jircik

Date: 10:53, October 24 2017



Laramie Energy, LLC

Garfield County, CO

CC 0697-03-07 Pad

CC 0697-03-12W

Wellbore #1

Plan: Design #2

QES Well Planning Report

24 October, 2017





Well Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well CC 0697-03-12W
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 0697-03-12W	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #2		

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:	2,236,874.98 usft	Longitude: -108.206835
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16"	Grid Convergence: -1.71°

Well	CC 0697-03-12W			
Well Position	+N/-S	1,484.3 usft	Northing:	1,639,602.10 usft
	+E/-W	477.3 usft	Easting:	2,237,396.31 usft
Position Uncertainty	0.0 usft		Wellhead Elevation:	
			Ground Level:	8,428.0 usft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	8/30/2017	9.78	65.60	51,493.72448204

Design	Design #2			
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	248.81

Plan Sections										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100usft)	Buidl 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	
500.0	0.00	0.00	500.0	0.0	0.0	0.00	0.00	0.00	0.00	
998.9	14.97	248.81	993.3	-23.4	-60.4	3.00	3.00	0.00	248.81	
7,118.0	14.97	248.81	6,904.7	-594.6	-1,534.0	0.00	0.00	0.00	0.00	
7,616.9	0.00	0.00	7,398.0	-618.1	-1,594.5	3.00	-3.00	0.00	180.00	
9,766.9	0.00	0.00	9,548.0	-618.1	-1,594.5	0.00	0.00	0.00	0.00	PBHL - CC 0697-03-1



Well Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well CC 0697-03-12W
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 0697-03-12W	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #2		

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
200.0	0.00	0.00	200.0	0.0	0.0	0.0	0.00	0.00	0.00
300.0	0.00	0.00	300.0	0.0	0.0	0.0	0.00	0.00	0.00
400.0	0.00	0.00	400.0	0.0	0.0	0.0	0.00	0.00	0.00
KOP (Build 3° / 100')									
500.0	0.00	0.00	500.0	0.0	0.0	0.0	0.00	0.00	0.00
600.0	3.00	248.81	600.0	-0.9	-2.4	2.6	3.00	3.00	0.00
700.0	6.00	248.81	699.6	-3.8	-9.8	10.5	3.00	3.00	0.00
800.0	9.00	248.81	798.8	-8.5	-21.9	23.5	3.00	3.00	0.00
900.0	12.00	248.81	897.1	-15.1	-38.9	41.7	3.00	3.00	0.00
EOB @ 14.97° Inc. / 248.81° Azm									
998.9	14.97	248.81	993.3	-23.4	-60.4	64.8	3.00	3.00	0.00
1,000.0	14.97	248.81	994.3	-23.5	-60.7	65.1	0.00	0.00	0.00
1,100.0	14.97	248.81	1,090.9	-32.9	-84.8	90.9	0.00	0.00	0.00
1,200.0	14.97	248.81	1,187.5	-42.2	-108.8	116.7	0.00	0.00	0.00
1,300.0	14.97	248.81	1,284.1	-51.5	-132.9	142.6	0.00	0.00	0.00
1,400.0	14.97	248.81	1,380.7	-60.9	-157.0	168.4	0.00	0.00	0.00
1,500.0	14.97	248.81	1,477.3	-70.2	-181.1	194.2	0.00	0.00	0.00
1,600.0	14.97	248.81	1,573.9	-79.5	-205.2	220.0	0.00	0.00	0.00
1,700.0	14.97	248.81	1,670.6	-88.9	-229.3	245.9	0.00	0.00	0.00
1,800.0	14.97	248.81	1,767.2	-98.2	-253.3	271.7	0.00	0.00	0.00
1,900.0	14.97	248.81	1,863.8	-107.5	-277.4	297.5	0.00	0.00	0.00
2,000.0	14.97	248.81	1,960.4	-116.9	-301.5	323.4	0.00	0.00	0.00
2,100.0	14.97	248.81	2,057.0	-126.2	-325.6	349.2	0.00	0.00	0.00
2,200.0	14.97	248.81	2,153.6	-135.5	-349.7	375.0	0.00	0.00	0.00
2,300.0	14.97	248.81	2,250.2	-144.9	-373.8	400.8	0.00	0.00	0.00
2,400.0	14.97	248.81	2,346.8	-154.2	-397.8	426.7	0.00	0.00	0.00
2,500.0	14.97	248.81	2,443.4	-163.5	-421.9	452.5	0.00	0.00	0.00
9 5/8"									
2,530.0	14.97	248.81	2,472.4	-166.3	-429.1	460.3	0.00	0.00	0.00
2,600.0	14.97	248.81	2,540.0	-172.9	-446.0	478.3	0.00	0.00	0.00
2,700.0	14.97	248.81	2,636.6	-182.2	-470.1	504.2	0.00	0.00	0.00
2,800.0	14.97	248.81	2,733.2	-191.6	-494.2	530.0	0.00	0.00	0.00
2,900.0	14.97	248.81	2,829.8	-200.9	-518.2	555.8	0.00	0.00	0.00
3,000.0	14.97	248.81	2,926.4	-210.2	-542.3	581.6	0.00	0.00	0.00
3,100.0	14.97	248.81	3,023.1	-219.6	-566.4	607.5	0.00	0.00	0.00
3,200.0	14.97	248.81	3,119.7	-228.9	-590.5	633.3	0.00	0.00	0.00
3,300.0	14.97	248.81	3,216.3	-238.2	-614.6	659.1	0.00	0.00	0.00
3,400.0	14.97	248.81	3,312.9	-247.6	-638.7	685.0	0.00	0.00	0.00
3,500.0	14.97	248.81	3,409.5	-256.9	-662.7	710.8	0.00	0.00	0.00
3,600.0	14.97	248.81	3,506.1	-266.2	-686.8	736.6	0.00	0.00	0.00
3,700.0	14.97	248.81	3,602.7	-275.6	-710.9	762.4	0.00	0.00	0.00
3,800.0	14.97	248.81	3,699.3	-284.9	-735.0	788.3	0.00	0.00	0.00
3,900.0	14.97	248.81	3,795.9	-294.2	-759.1	814.1	0.00	0.00	0.00
4,000.0	14.97	248.81	3,892.5	-303.6	-783.2	839.9	0.00	0.00	0.00
4,100.0	14.97	248.81	3,989.1	-312.9	-807.2	865.8	0.00	0.00	0.00
4,200.0	14.97	248.81	4,085.7	-322.2	-831.3	891.6	0.00	0.00	0.00
4,300.0	14.97	248.81	4,182.3	-331.6	-855.4	917.4	0.00	0.00	0.00
4,400.0	14.97	248.81	4,278.9	-340.9	-879.5	943.2	0.00	0.00	0.00
4,500.0	14.97	248.81	4,375.5	-350.3	-903.6	969.1	0.00	0.00	0.00
4,600.0	14.97	248.81	4,472.2	-359.6	-927.6	994.9	0.00	0.00	0.00
G' Sand									
4,626.8	14.97	248.81	4,498.0	-362.1	-934.1	1,001.8	0.00	0.00	0.00



Well Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well CC 0697-03-12W
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 0697-03-12W	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #2		

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	14.97	248.81	4,568.8	-368.9	-951.7	1,020.7	0.00	0.00	0.00
4,800.0	14.97	248.81	4,665.4	-378.3	-975.8	1,046.6	0.00	0.00	0.00
4,900.0	14.97	248.81	4,762.0	-387.6	-999.9	1,072.4	0.00	0.00	0.00
5,000.0	14.97	248.81	4,858.6	-396.9	-1,024.0	1,098.2	0.00	0.00	0.00
5,100.0	14.97	248.81	4,955.2	-406.3	-1,048.1	1,124.0	0.00	0.00	0.00
5,200.0	14.97	248.81	5,051.8	-415.6	-1,072.1	1,149.9	0.00	0.00	0.00
5,300.0	14.97	248.81	5,148.4	-424.9	-1,096.2	1,175.7	0.00	0.00	0.00
5,400.0	14.97	248.81	5,245.0	-434.3	-1,120.3	1,201.5	0.00	0.00	0.00
5,500.0	14.97	248.81	5,341.6	-443.6	-1,144.4	1,227.4	0.00	0.00	0.00
5,600.0	14.97	248.81	5,438.2	-452.9	-1,168.5	1,253.2	0.00	0.00	0.00
5,700.0	14.97	248.81	5,534.8	-462.3	-1,192.6	1,279.0	0.00	0.00	0.00
5,800.0	14.97	248.81	5,631.4	-471.6	-1,216.6	1,304.8	0.00	0.00	0.00
5,900.0	14.97	248.81	5,728.0	-480.9	-1,240.7	1,330.7	0.00	0.00	0.00
6,000.0	14.97	248.81	5,824.7	-490.3	-1,264.8	1,356.5	0.00	0.00	0.00
6,100.0	14.97	248.81	5,921.3	-499.6	-1,288.9	1,382.3	0.00	0.00	0.00
6,200.0	14.97	248.81	6,017.9	-508.9	-1,313.0	1,408.2	0.00	0.00	0.00
6,300.0	14.97	248.81	6,114.5	-518.3	-1,337.1	1,434.0	0.00	0.00	0.00
6,400.0	14.97	248.81	6,211.1	-527.6	-1,361.1	1,459.8	0.00	0.00	0.00
6,500.0	14.97	248.81	6,307.7	-537.0	-1,385.2	1,485.6	0.00	0.00	0.00
6,600.0	14.97	248.81	6,404.3	-546.3	-1,409.3	1,511.5	0.00	0.00	0.00
6,700.0	14.97	248.81	6,500.9	-555.6	-1,433.4	1,537.3	0.00	0.00	0.00
6,800.0	14.97	248.81	6,597.5	-565.0	-1,457.5	1,563.1	0.00	0.00	0.00
Williams Fork									
6,800.5	14.97	248.81	6,598.0	-565.0	-1,457.6	1,563.3	0.00	0.00	0.00
6,900.0	14.97	248.81	6,694.1	-574.3	-1,481.5	1,589.0	0.00	0.00	0.00
7,000.0	14.97	248.81	6,790.7	-583.6	-1,505.6	1,614.8	0.00	0.00	0.00
7,100.0	14.97	248.81	6,887.3	-593.0	-1,529.7	1,640.6	0.00	0.00	0.00
Drop 3° / 100'									
7,118.0	14.97	248.81	6,904.7	-594.6	-1,534.0	1,645.3	0.00	0.00	0.00
7,200.0	12.51	248.81	6,984.4	-601.7	-1,552.2	1,664.7	3.00	-3.00	0.00
7,300.0	9.51	248.81	7,082.5	-608.6	-1,570.0	1,683.8	3.00	-3.00	0.00
7,400.0	6.51	248.81	7,181.5	-613.6	-1,583.0	1,697.8	3.00	-3.00	0.00
7,500.0	3.51	248.81	7,281.1	-616.8	-1,591.1	1,706.5	3.00	-3.00	0.00
7,600.0	0.51	248.81	7,381.1	-618.0	-1,594.4	1,710.0	3.00	-3.00	0.00
EOD @ Vertical - TOG									
7,616.9	0.00	0.00	7,398.0	-618.1	-1,594.5	1,710.1	3.00	-3.00	0.00
7,700.0	0.00	0.00	7,481.1	-618.1	-1,594.5	1,710.1	0.00	0.00	0.00
7,800.0	0.00	0.00	7,581.1	-618.1	-1,594.5	1,710.1	0.00	0.00	0.00
7,900.0	0.00	0.00	7,681.1	-618.1	-1,594.5	1,710.1	0.00	0.00	0.00
8,000.0	0.00	0.00	7,781.1	-618.1	-1,594.5	1,710.1	0.00	0.00	0.00
8,100.0	0.00	0.00	7,881.1	-618.1	-1,594.5	1,710.1	0.00	0.00	0.00
8,200.0	0.00	0.00	7,981.1	-618.1	-1,594.5	1,710.1	0.00	0.00	0.00
8,300.0	0.00	0.00	8,081.1	-618.1	-1,594.5	1,710.1	0.00	0.00	0.00
8,400.0	0.00	0.00	8,181.1	-618.1	-1,594.5	1,710.1	0.00	0.00	0.00
8,500.0	0.00	0.00	8,281.1	-618.1	-1,594.5	1,710.1	0.00	0.00	0.00
8,600.0	0.00	0.00	8,381.1	-618.1	-1,594.5	1,710.1	0.00	0.00	0.00
8,700.0	0.00	0.00	8,481.1	-618.1	-1,594.5	1,710.1	0.00	0.00	0.00
8,800.0	0.00	0.00	8,581.1	-618.1	-1,594.5	1,710.1	0.00	0.00	0.00
Cameo									
8,816.9	0.00	0.00	8,598.0	-618.1	-1,594.5	1,710.1	0.00	0.00	0.00
8,900.0	0.00	0.00	8,681.1	-618.1	-1,594.5	1,710.1	0.00	0.00	0.00
9,000.0	0.00	0.00	8,781.1	-618.1	-1,594.5	1,710.1	0.00	0.00	0.00
9,100.0	0.00	0.00	8,881.1	-618.1	-1,594.5	1,710.1	0.00	0.00	0.00



Well Planning Report



Database:	EDM 5000 1 Single User Db	Local Co-ordinate Reference:	Well CC 0897-03-12W
Company:	Laramie Energy, LLC	TVD Reference:	WELL @ 8458 0usft (30' RKB)
Project:	Garfield County, CO	MD Reference:	WELL @ 8458 0usft (30' RKB)
Site:	CC 0897-03-07 Pad	North Reference:	True
Well:	CC 0897-03-12W	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #2		

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)
9,200.0	0.00	0.00	8,981.1	-618.1	-1,594.5	1,710.1	0.00	0.00	0.00
9,300.0	0.00	0.00	9,081.1	-618.1	-1,594.5	1,710.1	0.00	0.00	0.00
9,400.0	0.00	0.00	9,181.1	-618.1	-1,594.5	1,710.1	0.00	0.00	0.00
Base Cameo Coal									
9,476.9	0.00	0.00	9,258.0	-618.1	-1,594.5	1,710.1	0.00	0.00	0.00
9,500.0	0.00	0.00	9,281.1	-618.1	-1,594.5	1,710.1	0.00	0.00	0.00
Rollins									
9,516.9	0.00	0.00	9,298.0	-618.1	-1,594.5	1,710.1	0.00	0.00	0.00
9,600.0	0.00	0.00	9,381.1	-618.1	-1,594.5	1,710.1	0.00	0.00	0.00
9,700.0	0.00	0.00	9,481.1	-618.1	-1,594.5	1,710.1	0.00	0.00	0.00
TD @ 9766.9' MD / 9548.0' TVD									
9,766.9	0.00	0.00	9,548.0	-618.1	-1,594.5	1,710.1	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/mis target									
- Shape									
PBHL - CC 0897-03-12V	0.00	0.00	9,548.0	-618.1	-1,594.5	1,839,031.78	2,235,784.15	39.556625	-108.210787
- plan hits target center									
- Circle (radius 50.0)									

Casing Points

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
2,530.0	2,472.4	9 5/8"	9-5/8	12-1/4

Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
4,626.8	4,498.0	G' Sand			
6,800.5	6,598.0	Williams Fork			
7,616.9	7,398.0	TOG			
8,816.9	8,598.0	Cameo			
9,476.9	9,258.0	Base Cameo Coal			
9,516.9	9,298.0	Rollins			



Well Planning Report



Database:	EDM 5000 1 Single User Db	Local Co-ordinate Reference:	Well CC 0697-03-12W
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 0697-03-12W	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #2		

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
500.0	500.0	0.0	0.0	KOP (Build 3" / 100')
998.9	993.3	-23.4	-60.4	EOB @ 14.97° Inc. / 248.81° Azm
7,118.0	6,904.7	-594.6	-1,534.0	Drop 3" / 100'
7,616.9	7,398.0	-618.1	-1,594.5	EOD @ Vertical
9,766.9	9,548.0	-618.1	-1,594.5	TD @ 9766.9' MD / 9548.0' TVD