

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 Federal 0697-04-02E

+N-S 0.0 +E-W 0.0 Northing 1639443.58 Easting 2233540.37 8609.0 Latitude 39.557571 Longitude -108.218795

Project: Garfield County, CO
Site: CC 604-41-32 Pad
Well: CC Federal 0697-04-02E
Wellbore: Wellbore #1
Design: Design #1
Latitude: 39.557571
Longitude: -108.218795
Ground Level: 8609.0
well @ 8633.0usft (24' RKB)



DIRECTIONAL DRILLING

REFERENCE INFORMATION

Co-ordinate (N/E) Reference: Well CC Federal 0697-04-02E, True North
Vertical (TVD) Reference: well @ 8633.0usft (24' RKB)
Section (VS) Reference: Slot - (0.0N, 0.0E)
Measured Depth Reference: well @ 8633.0usft (24' RKB)
Calculation Method: Minimum Curvature

FORMATION TOP DETAILS

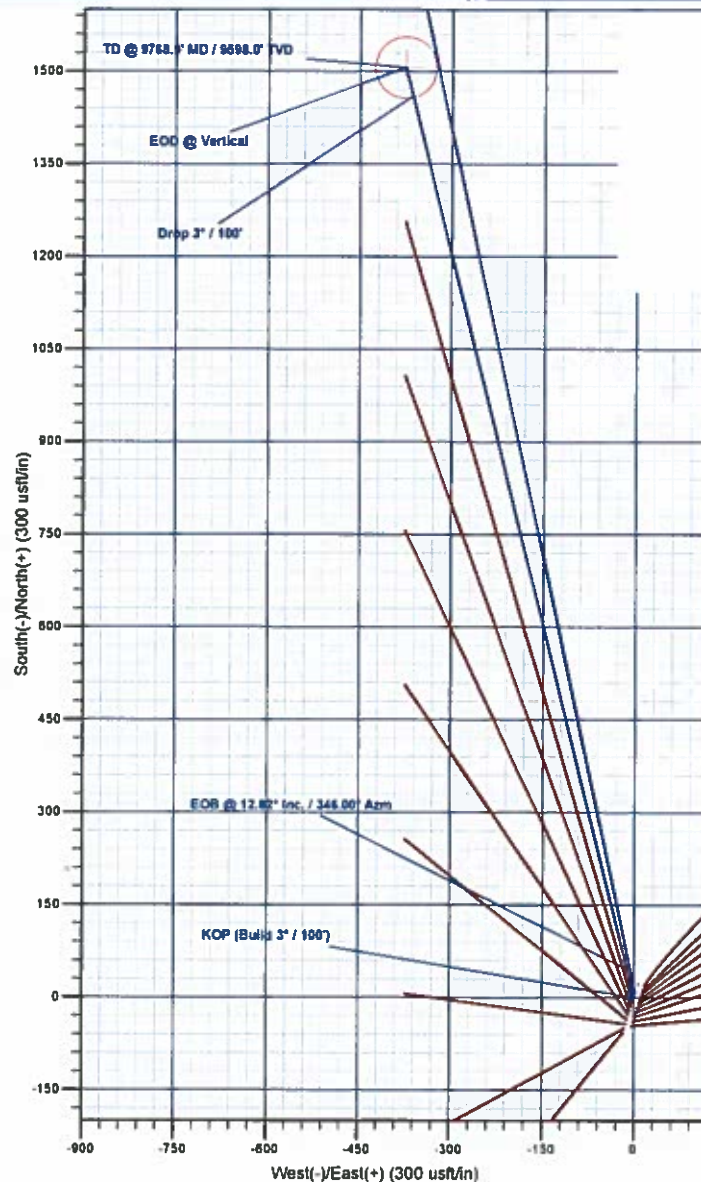
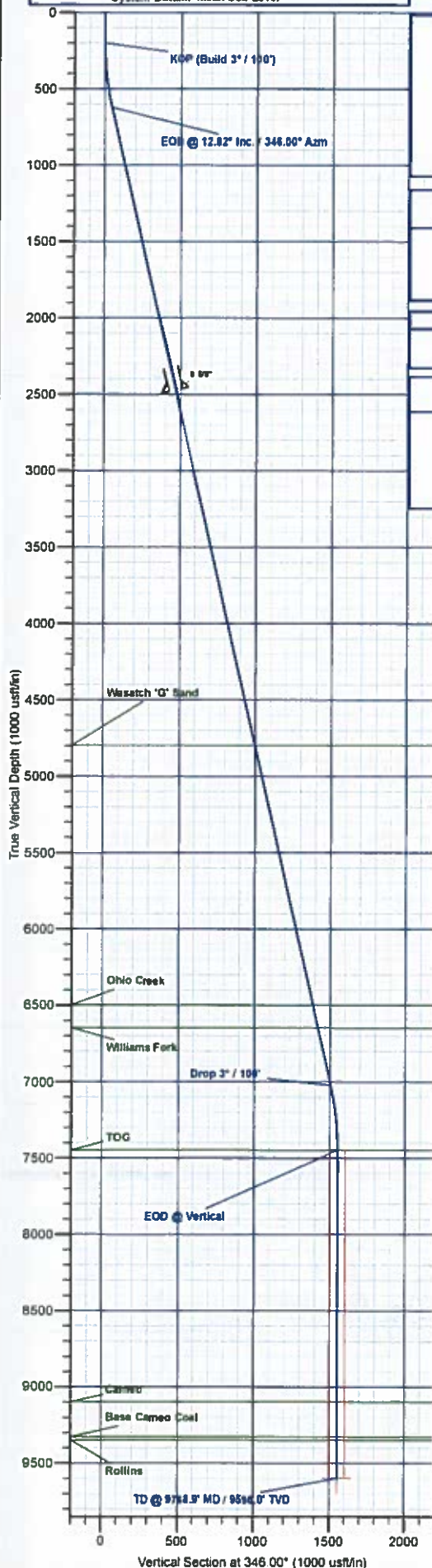
TVDPath	MDPath	Formation
4798.0	4908.4	Wasatch 'G' Sand
6498.0	6651.8	Ohio Creek
6648.0	6805.7	Williams Fork
7448.0	7518.9	TOG
9098.0	9268.9	Cameo
9328.0	9488.9	Base Cameo Coal
9348.0	9518.9	Rollins

DESIGN TARGET DETAILS

Name	TVD	+N-S	+E-W	Northing	Easting	Latitude	Longitude
PBHL - CC Federal 0697-04-02E	9598.0	1506.2	-375.5	1640960.31	2233210.67	39.561706	-108.220127

SECTION DETAILS

MD	Inc	Azi	TVD	+N-S	+E-W	Dleg	TFace	VSect	Annotation
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
200.0	0.00	0.00	200.0	0.0	0.0	0.00	0.00	0.0	
627.5	12.82	346.00	623.9	46.2	-11.5	3.00	346.00	47.6	KOP (Build 3" / 100')
7191.4	12.82	346.00	7024.1	1439.9	-364.0	0.00	0.00	1504.6	EOB @ 12.82" Inc. / 346.00" Azm
7618.9	0.00	0.00	7448.0	1506.2	-375.5	3.00	160.00	1552.3	Drop 3" / 100'
9768.9	0.00	0.00	9598.0	1506.2	-375.5	0.00	0.00	1552.3	EOB @ Vertical
									TD @ 9768.9' MD / 9598.0' TVD



Legend

↑ T M
Azimuths to True N
Magnetic North: ↑
Magnetic I
Strength: 51479.2
Dip Angle: 61
Date: 10/4/
Model: IGRF

Plan: Design #1 (CC Federal 0697-04-02E/Wellbore #1)

Created By: Will Jircik

Date: 15:06, October 04 2017



Laramie Energy, LLC

Garfield County, CO
CC 604-41-32 Pad
CC Federal 0697-04-02E

Wellbore #1

Plan: Design #1

QES Well Planning Report

04 October, 2017





Well Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well CC Federal 0697-04-02E
Company:	Laramie Energy, LLC	TVD Reference:	well @ 8633.0usft (24' RKB)
Project:	Garfield County, CO	MD Reference:	well @ 8633.0usft (24' RKB)
Site:	CC 604-41-32 Pad	North Reference:	True
Well:	CC Federal 0697-04-02E	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #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 604-41-32 Pad			
Site Position:		Northing:	1,639,464.67 usft	Latitude: 39.557630
From:	Lat/Long	Easting:	2,233,548.14 usft	Longitude: -108.218770
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence: -1.71 "

Well	CC Federal 0697-04-02E			
Well Position	+N/-S	-21.3 usft	Northing:	1,639,443.57 usft
	+E/-W	-7.1 usft	Easting:	2,233,540.37 usft
Position Uncertainty	0.0 usft	Wellhead Elevation:		Ground Level: 8,609.0 usft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	10/4/2017	9.77	65.59	51,479.52714463

Design	Design #1			
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	346.00

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	
200.0	0.00	0.00	200.0	0.0	0.0	0.00	0.00	0.00	0.00	
627.5	12.82	346.00	623.9	46.2	-11.5	3.00	3.00	0.00	346.00	
7,191.4	12.82	346.00	7,024.1	1,459.9	-364.0	0.00	0.00	0.00	0.00	
7,618.9	0.00	0.00	7,448.0	1,506.2	-375.5	3.00	-3.00	0.00	180.00	
9,768.9	0.00	0.00	9,598.0	1,506.2	-375.5	0.00	0.00	0.00	0.00	PBHL - CC Federal 0697-04-02E



Well Planning Report



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Company:	Laramie Energy, LLC	TVD Reference:	well @ 8633.0usft (24' RKB)
Project:	Garfield County, CO	MD Reference:	well @ 8633.0usft (24' RKB)
Site:	CC 604-41-32 Pad	North Reference:	True
Well:	CC Federal 0697-04-02E	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #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
100.0	0.00	0.00	100.0	0.0	0.0	0.0	0.00	0.00	0.00
KOP (Build 3" / 100')									
200.0	0.00	0.00	200.0	0.0	0.0	0.0	0.00	0.00	0.00
300.0	3.00	346.00	300.0	2.5	-0.6	2.6	3.00	3.00	0.00
400.0	6.00	346.00	399.6	10.2	-2.5	10.5	3.00	3.00	0.00
500.0	9.00	346.00	498.8	22.8	-5.7	23.5	3.00	3.00	0.00
600.0	12.00	346.00	597.1	40.5	-10.1	41.7	3.00	3.00	0.00
EOB @ 12.82° Inc. / 346.00° Azm									
627.5	12.82	346.00	623.9	46.2	-11.5	47.6	3.00	3.00	0.00
700.0	12.82	346.00	694.6	61.8	-15.4	63.7	0.00	0.00	0.00
800.0	12.82	346.00	792.1	83.4	-20.8	85.9	0.00	0.00	0.00
900.0	12.82	346.00	889.6	104.9	-26.2	108.1	0.00	0.00	0.00
1,000.0	12.82	346.00	987.1	126.5	-31.5	130.3	0.00	0.00	0.00
1,100.0	12.82	346.00	1,084.7	148.0	-36.9	152.5	0.00	0.00	0.00
1,200.0	12.82	346.00	1,182.2	169.5	-42.3	174.7	0.00	0.00	0.00
1,300.0	12.82	346.00	1,279.7	191.1	-47.6	196.9	0.00	0.00	0.00
1,400.0	12.82	346.00	1,377.2	212.6	-53.0	219.1	0.00	0.00	0.00
1,500.0	12.82	346.00	1,474.7	234.1	-58.4	241.3	0.00	0.00	0.00
1,600.0	12.82	346.00	1,572.2	255.7	-63.8	263.5	0.00	0.00	0.00
1,700.0	12.82	346.00	1,669.7	277.2	-69.1	285.7	0.00	0.00	0.00
1,800.0	12.82	346.00	1,767.2	298.8	-74.5	307.9	0.00	0.00	0.00
1,900.0	12.82	346.00	1,864.7	320.3	-79.9	330.1	0.00	0.00	0.00
2,000.0	12.82	346.00	1,962.2	341.8	-85.2	352.3	0.00	0.00	0.00
2,100.0	12.82	346.00	2,059.7	363.4	-90.6	374.5	0.00	0.00	0.00
2,200.0	12.82	346.00	2,157.2	384.9	-96.0	396.7	0.00	0.00	0.00
2,300.0	12.82	346.00	2,254.7	406.4	-101.3	418.9	0.00	0.00	0.00
2,400.0	12.82	346.00	2,352.2	428.0	-106.7	441.1	0.00	0.00	0.00
2,500.0	12.82	346.00	2,449.7	449.5	-112.1	463.3	0.00	0.00	0.00
9 5/8"									
2,524.0	12.82	346.00	2,473.1	454.7	-113.4	468.6	0.00	0.00	0.00
2,600.0	12.82	346.00	2,547.2	471.1	-117.5	485.5	0.00	0.00	0.00
2,700.0	12.82	346.00	2,644.7	492.6	-122.8	507.7	0.00	0.00	0.00
2,800.0	12.82	346.00	2,742.2	514.1	-128.2	529.9	0.00	0.00	0.00
2,900.0	12.82	346.00	2,839.7	535.7	-133.6	552.1	0.00	0.00	0.00
3,000.0	12.82	346.00	2,937.3	557.2	-138.9	574.3	0.00	0.00	0.00
3,100.0	12.82	346.00	3,034.8	578.8	-144.3	596.5	0.00	0.00	0.00
3,200.0	12.82	346.00	3,132.3	600.3	-149.7	618.7	0.00	0.00	0.00
3,300.0	12.82	346.00	3,229.8	621.8	-155.0	640.9	0.00	0.00	0.00
3,400.0	12.82	346.00	3,327.3	643.4	-160.4	663.1	0.00	0.00	0.00
3,500.0	12.82	346.00	3,424.8	664.9	-165.8	685.3	0.00	0.00	0.00
3,600.0	12.82	346.00	3,522.3	686.4	-171.2	707.5	0.00	0.00	0.00
3,700.0	12.82	346.00	3,619.8	708.0	-176.5	729.7	0.00	0.00	0.00
3,800.0	12.82	346.00	3,717.3	729.5	-181.9	751.9	0.00	0.00	0.00
3,900.0	12.82	346.00	3,814.8	751.1	-187.3	774.0	0.00	0.00	0.00
4,000.0	12.82	346.00	3,912.3	772.6	-192.6	796.2	0.00	0.00	0.00
4,100.0	12.82	346.00	4,009.8	794.1	-198.0	818.4	0.00	0.00	0.00
4,200.0	12.82	346.00	4,107.3	815.7	-203.4	840.6	0.00	0.00	0.00
4,300.0	12.82	346.00	4,204.8	837.2	-208.7	862.8	0.00	0.00	0.00
4,400.0	12.82	346.00	4,302.3	858.7	-214.1	885.0	0.00	0.00	0.00
4,500.0	12.82	346.00	4,399.8	880.3	-219.5	907.2	0.00	0.00	0.00
4,600.0	12.82	346.00	4,497.3	901.8	-224.9	929.4	0.00	0.00	0.00
4,700.0	12.82	346.00	4,594.8	923.4	-230.2	951.6	0.00	0.00	0.00



Well Planning Report



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Project:	Garfield County, CO	MD Reference:	well @ 8633.0usft (24' RKB)
Site:	CC 804-41-32 Pad	North Reference:	True
Well:	CC Federal 0697-04-02E	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #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)
4,800.0	12.82	346.00	4,692.3	944.9	-235.6	973.8	0.00	0.00	0.00
4,900.0	12.82	346.00	4,789.9	956.4	-241.0	996.0	0.00	0.00	0.00
Wasatch 'G' Sand									
4,908.4	12.82	346.00	4,798.0	968.2	-241.4	997.9	0.00	0.00	0.00
5,000.0	12.82	346.00	4,887.4	988.0	-246.3	1,018.2	0.00	0.00	0.00
5,100.0	12.82	346.00	4,984.9	1,009.5	-251.7	1,040.4	0.00	0.00	0.00
5,200.0	12.82	346.00	5,082.4	1,031.0	-257.1	1,062.6	0.00	0.00	0.00
5,300.0	12.82	346.00	5,179.9	1,052.6	-262.4	1,084.8	0.00	0.00	0.00
5,400.0	12.82	346.00	5,277.4	1,074.1	-267.8	1,107.0	0.00	0.00	0.00
5,500.0	12.82	346.00	5,374.9	1,095.7	-273.2	1,129.2	0.00	0.00	0.00
5,600.0	12.82	346.00	5,472.4	1,117.2	-278.6	1,151.4	0.00	0.00	0.00
5,700.0	12.82	346.00	5,569.9	1,138.7	-283.9	1,173.6	0.00	0.00	0.00
5,800.0	12.82	346.00	5,667.4	1,160.3	-289.3	1,195.8	0.00	0.00	0.00
5,900.0	12.82	346.00	5,764.9	1,181.8	-294.7	1,218.0	0.00	0.00	0.00
6,000.0	12.82	346.00	5,862.4	1,203.3	-300.0	1,240.2	0.00	0.00	0.00
6,100.0	12.82	346.00	5,959.9	1,224.9	-305.4	1,262.4	0.00	0.00	0.00
6,200.0	12.82	346.00	6,057.4	1,246.4	-310.8	1,284.6	0.00	0.00	0.00
6,300.0	12.82	346.00	6,154.9	1,268.0	-316.1	1,306.8	0.00	0.00	0.00
6,400.0	12.82	346.00	6,252.4	1,289.5	-321.5	1,329.0	0.00	0.00	0.00
6,500.0	12.82	346.00	6,349.9	1,311.0	-326.9	1,351.2	0.00	0.00	0.00
6,600.0	12.82	346.00	6,447.4	1,332.6	-332.3	1,373.4	0.00	0.00	0.00
Ohio Creek									
6,651.8	12.82	346.00	6,498.0	1,343.7	-335.0	1,384.9	0.00	0.00	0.00
6,700.0	12.82	346.00	6,544.9	1,354.1	-337.6	1,395.6	0.00	0.00	0.00
6,800.0	12.82	346.00	6,642.5	1,375.6	-343.0	1,417.8	0.00	0.00	0.00
Williams Fork									
6,805.7	12.82	346.00	6,648.0	1,376.9	-343.3	1,419.0	0.00	0.00	0.00
6,900.0	12.82	346.00	6,740.0	1,397.2	-348.4	1,440.0	0.00	0.00	0.00
7,000.0	12.82	346.00	6,837.5	1,418.7	-353.7	1,462.2	0.00	0.00	0.00
7,100.0	12.82	346.00	6,935.0	1,440.3	-359.1	1,484.4	0.00	0.00	0.00
Drop 3° / 100'									
7,181.4	12.82	346.00	7,024.1	1,459.9	-364.0	1,504.6	0.00	0.00	0.00
7,200.0	12.57	346.00	7,032.5	1,461.8	-364.5	1,508.5	3.00	-3.00	0.00
7,300.0	9.57	346.00	7,130.6	1,480.4	-369.1	1,525.7	3.00	-3.00	0.00
7,400.0	6.57	346.00	7,229.6	1,494.0	-372.5	1,539.8	3.00	-3.00	0.00
7,500.0	3.57	346.00	7,329.2	1,502.6	-374.6	1,548.6	3.00	-3.00	0.00
7,600.0	0.57	346.00	7,429.1	1,506.1	-375.5	1,552.2	3.00	-3.00	0.00
EOD @ Vertical - TOG									
7,618.9	0.00	0.00	7,448.0	1,506.2	-375.5	1,552.3	3.00	-3.00	74.20
7,700.0	0.00	0.00	7,529.1	1,506.2	-375.5	1,552.3	0.00	0.00	0.00
7,800.0	0.00	0.00	7,629.1	1,506.2	-375.5	1,552.3	0.00	0.00	0.00
7,900.0	0.00	0.00	7,729.1	1,506.2	-375.5	1,552.3	0.00	0.00	0.00
8,000.0	0.00	0.00	7,829.1	1,506.2	-375.5	1,552.3	0.00	0.00	0.00
8,100.0	0.00	0.00	7,929.1	1,506.2	-375.5	1,552.3	0.00	0.00	0.00
8,200.0	0.00	0.00	8,029.1	1,506.2	-375.5	1,552.3	0.00	0.00	0.00
8,300.0	0.00	0.00	8,129.1	1,506.2	-375.5	1,552.3	0.00	0.00	0.00
8,400.0	0.00	0.00	8,229.1	1,506.2	-375.5	1,552.3	0.00	0.00	0.00
8,500.0	0.00	0.00	8,329.1	1,506.2	-375.5	1,552.3	0.00	0.00	0.00
8,600.0	0.00	0.00	8,429.1	1,506.2	-375.5	1,552.3	0.00	0.00	0.00
8,700.0	0.00	0.00	8,529.1	1,506.2	-375.5	1,552.3	0.00	0.00	0.00
8,800.0	0.00	0.00	8,629.1	1,506.2	-375.5	1,552.3	0.00	0.00	0.00
8,900.0	0.00	0.00	8,729.1	1,506.2	-375.5	1,552.3	0.00	0.00	0.00
9,000.0	0.00	0.00	8,829.1	1,506.2	-375.5	1,552.3	0.00	0.00	0.00
9,100.0	0.00	0.00	8,929.1	1,506.2	-375.5	1,552.3	0.00	0.00	0.00



Well Planning Report



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Well:	CC Federal 0697-04-02E	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #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)
9,200.0	0.00	0.00	9,029.1	1,506.2	-375.5	1,552.3	0.00	0.00	0.00
Cameo									
9,268.9	0.00	0.00	9,098.0	1,506.2	-375.5	1,552.3	0.00	0.00	0.00
9,300.0	0.00	0.00	9,129.1	1,506.2	-375.5	1,552.3	0.00	0.00	0.00
9,400.0	0.00	0.00	9,229.1	1,506.2	-375.5	1,552.3	0.00	0.00	0.00
Base Cameo Coal									
9,498.9	0.00	0.00	9,328.0	1,506.2	-375.5	1,552.3	0.00	0.00	0.00
9,500.0	0.00	0.00	9,329.1	1,506.2	-375.5	1,552.3	0.00	0.00	0.00
Rollins									
9,518.9	0.00	0.00	9,348.0	1,506.2	-375.5	1,552.3	0.00	0.00	0.00
9,600.0	0.00	0.00	9,429.1	1,506.2	-375.5	1,552.3	0.00	0.00	0.00
9,700.0	0.00	0.00	9,529.1	1,506.2	-375.5	1,552.3	0.00	0.00	0.00
TD @ 9768.9' MD / 9598.0' TVD									
9,768.9	0.00	0.00	9,598.0	1,506.2	-375.5	1,552.3	0.00	0.00	0.00

Design Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
PBHL - CC Federal 069; - plan hits target center - Circle (radius 50.0)	0.00	0.00	9,598.0	1,506.2	-375.5	1,640,960.31	2,233,210.07	39.561706	-108.220127

Casing Points

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
2,524.0	2,473.1	9 5/8"	9-5/8	14-3/4

Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
4,908.4	4,798.0	Wasatch 'G' Sand			
6,651.8	6,498.0	Ohio Creek			
6,805.7	6,648.0	Williams Fork			
7,618.9	7,448.0	TOG			
9,268.9	9,098.0	Cameo			
9,498.9	9,328.0	Base Cameo Coal			
9,518.9	9,348.0	Rollins			



Well Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well CC Federal 0697-04-02E
Company:	Laramie Energy, LLC	TVD Reference:	well @ 8633.0usft (24' RKB)
Project:	Garfield County, CO	MD Reference:	well @ 8633.0usft (24' RKB)
Site:	CC 604-41-32 Pad	North Reference:	True
Well:	CC Federal 0697-04-02E	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #1		

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
200.0	200.0	0.0	0.0	KOP (Build 3" / 100')
627.5	623.9	46.2	-11.5	EOB @ 12.82" Inc. / 346.00' Azm
7,191.4	7,024.1	1,459.9	-364.0	Drop 3" / 100'
7,618.9	7,448.0	1,506.2	-375.5	EOD @ Vertical
9,768.9	9,598.0	1,506.2	-375.5	TD @ 9768.9' MD / 9598.0' TVD