

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 0697-04-08E

+N/-S 0.0 +E/-W 0.0 Northing 1639406.08 Ground Level: 8609.0 Easting 2233626.84 Latitude 39.557467 Longitude -108.218839

Project: Garfield County, CO

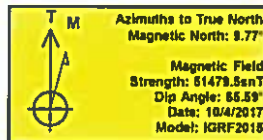
Site: CC 604-41-32 Pad
Well: CC 0697-04-08E
Wellbore: Wellbore #1
Design: Design #3
Latitude: 39.557467
Longitude: -108.218839
Ground Level: 8609.0
Well @ 8639.0usft (RKB 30')



DIRECTIONAL DRILLING

FORMATION TOP DETAILS

TVDPath	MDPath	Formation
605.0	605.0	Mahogany
4648.0	4647.2	Wasatch 'G' Sand
6348.0	6367.2	Ohio Creek
6498.0	6517.2	Williams Fork
7298.0	7317.2	TOG
8948.0	8967.2	Cameo
9178.0	9197.2	Base Cameo Coal
9198.0	9217.2	Rollins
9438.0	9455.2	Cozette
9709.0	9728.2	Corcoran



REFERENCE INFORMATION

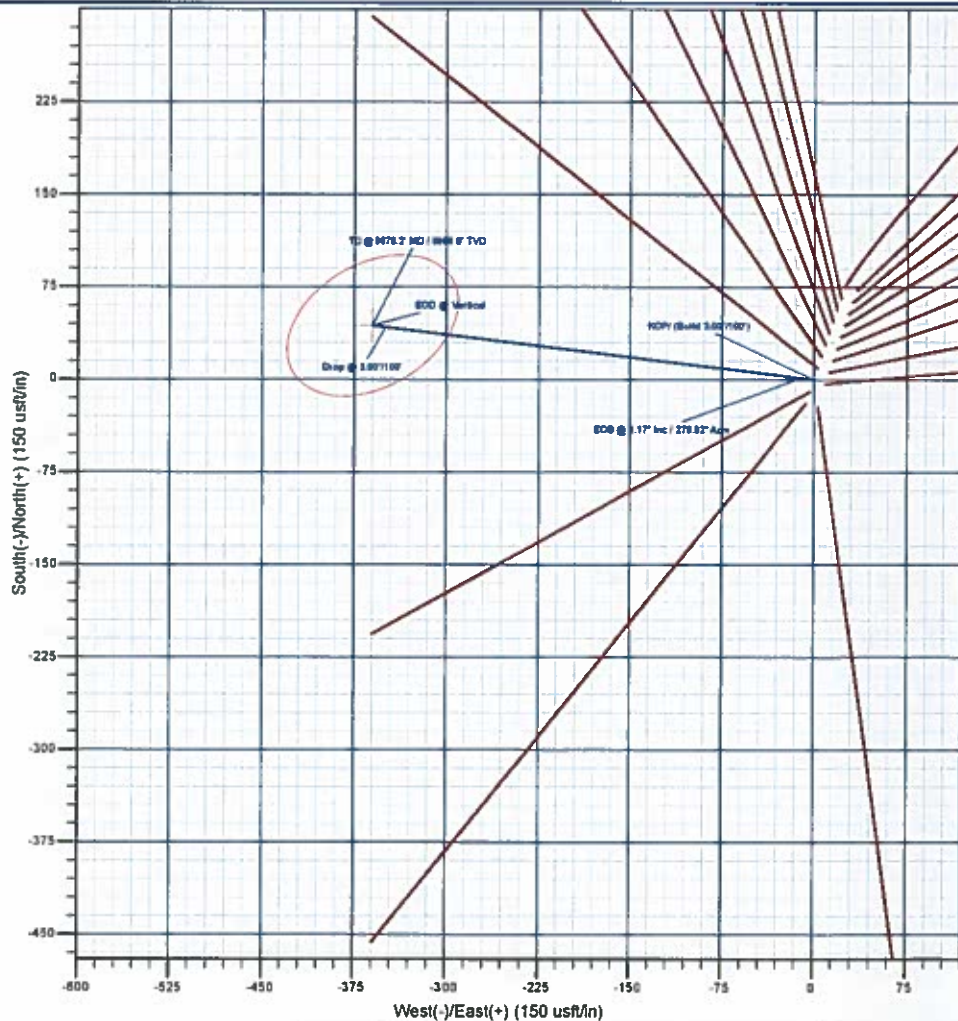
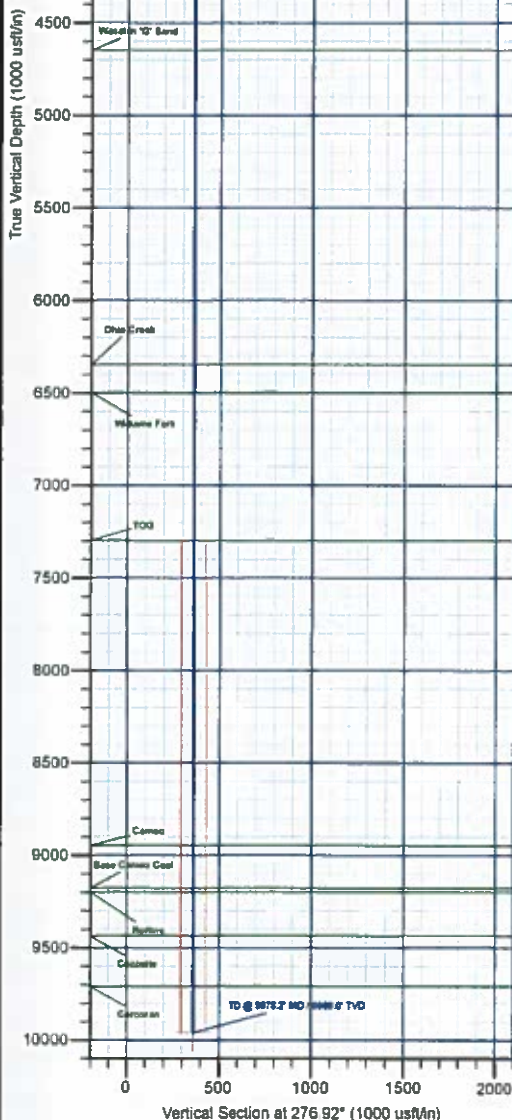
Co-ordinate (N/E) Reference: Well CC 0697-04-08E, True North
Vertical (TVD) Reference: Well @ 8639.0usft (RKB 30')
Section (VS) Reference: S101 - (0.0N, 0.0E)
Measured Depth Reference: Well @ 8639.0usft (RKB 30')
Calculation Method: Minimum Curvature

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
PBHL - CC 0697-04-08E	9959.0	43.7	-360.1	1639460.56	2233168.25	39.557567	-108.220115

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	KOP (Build 3.00"/100')
400.0	0.00	0.00	400.0	0.0	0.0	0.00	0.00	0.0	EOB @ 6.17" Inc / 276.92" Azm
805.8	6.17	276.92	805.4	1.3	-11.0	3.00	276.92	11.1	Drop @ 3.00"/100'
3772.4	6.17	276.92	3753.6	42.4	-349.1	0.00	0.00	351.6	EOB @ Vertical
3978.2	0.00	0.00	3959.5	43.7	-360.1	3.00	180.00	362.7	TD @ 3978.2' MD / 9959.0' TVD
9978.2	0.00	0.00	9959.0	43.7	-360.1	0.00	0.00	362.7	



Plan: Design #3 (CC 0697-04-08E/Wellbore #1)

Created By: Will Jircik Date: 14:26, February 04 2019



Laramie Energy, LLC

Garfield County, CO

CC 604-41-32 Pad

CC 0697-04-08E

Wellbore #1

Plan: Design #3

QES Well Planning Report

04 February, 2019





Well Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well CC 0697-04-08E
Company:	Laramie Energy, LLC	TVD Reference:	Well @ 8639.0usft (RKB 30')
Project:	Garfield County, CO	MD Reference:	Well @ 8639.0usft (RKB 30')
Site:	CC 604-41-32 Pad	North Reference:	True
Well:	CC 0697-04-08E	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #3		

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 0697-04-08E			
Well Position	+N/-S	-59.2 usft	Northing:	1,639,406.07 usft
	+E/-W	-19.5 usft	Easting:	2,233,526.84 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	51,479.46564260

Design	Design #3			
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	276.92

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	
400.0	0.00	0.00	400.0	0.0	0.0	0.00	0.00	0.00	0.00	
605.8	6.17	276.92	605.4	1.3	-11.0	3.00	3.00	0.00	276.92	
3,772.4	6.17	276.92	3,753.6	42.4	-349.1	0.00	0.00	0.00	0.00	
3,978.2	0.00	0.00	3,959.0	43.7	-360.1	3.00	-3.00	0.00	180.00	
9,978.2	0.00	0.00	9,959.0	43.7	-360.1	0.00	0.00	0.00	0.00	PBHL - CC 0697-04-C



Well Planning Report



Database: EDM 5000.1 Single User Db
 Company: Laramie Energy, LLC
 Project: Garfield County, CO
 Site: CC 604-41-32 Pad
 Well: CC 0697-04-08E
 Wellbore: Wellbore #1
 Design: Design #3

Local Co-ordinate Reference:
 TVD Reference:
 MD Reference:
 North Reference:
 Survey Calculation Method:

Well CC 0697-04-08E
 Well @ 8639.0usft (RKB 30")
 Well @ 8639.0usft (RKB 30")
 True
 Minimum Curvature

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
KOP/ (Build 3.00°/100')									
400.0	0.00	0.00	400.0	0.0	0.0	0.0	0.00	0.00	0.00
500.0	3.00	276.92	500.0	0.3	-2.6	2.6	3.00	3.00	0.00
600.0	6.00	276.92	599.6	1.3	-10.4	10.5	3.00	3.00	0.00
EOB @ 6.17° Inc / 276.92° Azm									
605.8	6.17	276.92	605.4	1.3	-11.0	11.1	3.00	3.00	0.00
Mahogany									
606.4	6.17	276.92	606.0	1.3	-11.1	11.1	0.00	0.00	0.00
700.0	6.17	276.92	699.1	2.6	-21.1	21.2	0.00	0.00	0.00
800.0	6.17	276.92	798.5	3.9	-31.7	32.0	0.00	0.00	0.00
900.0	6.17	276.92	897.9	5.2	-42.4	42.7	0.00	0.00	0.00
1,000.0	6.17	276.92	997.3	6.4	-53.1	53.5	0.00	0.00	0.00
1,100.0	6.17	276.92	1,096.7	7.7	-63.8	64.2	0.00	0.00	0.00
1,200.0	6.17	276.92	1,196.2	9.0	-74.4	75.0	0.00	0.00	0.00
1,300.0	6.17	276.92	1,295.6	10.3	-85.1	85.7	0.00	0.00	0.00
1,400.0	6.17	276.92	1,395.0	11.6	-95.8	96.5	0.00	0.00	0.00
1,500.0	6.17	276.92	1,494.4	12.9	-106.5	107.2	0.00	0.00	0.00
1,600.0	6.17	276.92	1,593.8	14.2	-117.1	118.0	0.00	0.00	0.00
1,700.0	6.17	276.92	1,693.3	15.5	-127.8	128.8	0.00	0.00	0.00
1,800.0	6.17	276.92	1,792.7	16.8	-138.5	139.5	0.00	0.00	0.00
1,900.0	6.17	276.92	1,892.1	18.1	-149.2	150.3	0.00	0.00	0.00
2,000.0	6.17	276.92	1,991.5	19.4	-159.8	161.0	0.00	0.00	0.00
2,100.0	6.17	276.92	2,090.9	20.7	-170.5	171.8	0.00	0.00	0.00
2,200.0	6.17	276.92	2,190.4	22.0	-181.2	182.5	0.00	0.00	0.00
2,300.0	6.17	276.92	2,289.8	23.3	-191.9	193.3	0.00	0.00	0.00
2,400.0	6.17	276.92	2,389.2	24.6	-202.5	204.0	0.00	0.00	0.00
2,500.0	6.17	276.92	2,488.6	25.9	-213.2	214.8	0.00	0.00	0.00
2,600.0	6.17	276.92	2,588.0	27.2	-223.9	225.5	0.00	0.00	0.00
2,700.0	6.17	276.92	2,687.5	28.5	-234.6	236.3	0.00	0.00	0.00
2,800.0	6.17	276.92	2,786.9	29.8	-245.2	247.1	0.00	0.00	0.00
2,900.0	6.17	276.92	2,886.3	31.1	-255.9	257.8	0.00	0.00	0.00
3,000.0	6.17	276.92	2,985.7	32.4	-266.6	268.6	0.00	0.00	0.00
3,100.0	6.17	276.92	3,085.1	33.7	-277.3	279.3	0.00	0.00	0.00
3,200.0	6.17	276.92	3,184.6	35.0	-288.0	290.1	0.00	0.00	0.00
3,300.0	6.17	276.92	3,284.0	36.3	-298.6	300.8	0.00	0.00	0.00
3,400.0	6.17	276.92	3,383.4	37.6	-309.3	311.6	0.00	0.00	0.00
3,500.0	6.17	276.92	3,482.8	38.9	-320.0	322.3	0.00	0.00	0.00
3,600.0	6.17	276.92	3,582.2	40.2	-330.7	333.1	0.00	0.00	0.00
3,700.0	6.17	276.92	3,681.7	41.5	-341.3	343.8	0.00	0.00	0.00
Drop @ 3.00°/100'									
3,772.4	6.17	276.92	3,753.6	42.4	-349.1	351.6	0.00	0.00	0.00
3,800.0	5.34	276.92	3,781.1	42.7	-351.8	354.4	3.00	-3.00	0.00
3,900.0	2.34	276.92	3,880.9	43.5	-358.5	361.1	3.00	-3.00	0.00
EOD @ Vertical									
3,978.2	0.00	0.00	3,959.0	43.7	-360.1	362.7	3.00	-3.00	0.00
4,000.0	0.00	0.00	3,980.8	43.7	-360.1	362.7	0.00	0.00	0.00
4,100.0	0.00	0.00	4,080.8	43.7	-360.1	362.7	0.00	0.00	0.00
4,200.0	0.00	0.00	4,180.8	43.7	-360.1	362.7	0.00	0.00	0.00
4,300.0	0.00	0.00	4,280.8	43.7	-360.1	362.7	0.00	0.00	0.00
4,400.0	0.00	0.00	4,380.8	43.7	-360.1	362.7	0.00	0.00	0.00



Well Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well CC 0697-04-08E
Company:	Laramie Energy, LLC	TVD Reference:	Well @ 8639.0usft (RKB 30')
Project:	Garfield County, CO	MD Reference:	Well @ 8639.0usft (RKB 30')
Site:	CC 804-41-32 Pad	North Reference:	True
Well:	CC 0697-04-08E	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #3		

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)
4,500.0	0.00	0.00	4,480.8	43.7	-360.1	362.7	0.00	0.00	0.00
4,600.0	0.00	0.00	4,580.8	43.7	-360.1	362.7	0.00	0.00	0.00
Wasatch 'G' Sand									
4,667.2	0.00	0.00	4,648.0	43.7	-360.1	362.7	0.00	0.00	0.00
4,700.0	0.00	0.00	4,680.8	43.7	-360.1	362.7	0.00	0.00	0.00
4,800.0	0.00	0.00	4,780.8	43.7	-360.1	362.7	0.00	0.00	0.00
4,900.0	0.00	0.00	4,880.8	43.7	-360.1	362.7	0.00	0.00	0.00
5,000.0	0.00	0.00	4,980.8	43.7	-360.1	362.7	0.00	0.00	0.00
5,100.0	0.00	0.00	5,080.8	43.7	-360.1	362.7	0.00	0.00	0.00
5,200.0	0.00	0.00	5,180.8	43.7	-360.1	362.7	0.00	0.00	0.00
5,300.0	0.00	0.00	5,280.8	43.7	-360.1	362.7	0.00	0.00	0.00
5,400.0	0.00	0.00	5,380.8	43.7	-360.1	362.7	0.00	0.00	0.00
5,500.0	0.00	0.00	5,480.8	43.7	-360.1	362.7	0.00	0.00	0.00
5,600.0	0.00	0.00	5,580.8	43.7	-360.1	362.7	0.00	0.00	0.00
5,700.0	0.00	0.00	5,680.8	43.7	-360.1	362.7	0.00	0.00	0.00
5,800.0	0.00	0.00	5,780.8	43.7	-360.1	362.7	0.00	0.00	0.00
5,900.0	0.00	0.00	5,880.8	43.7	-360.1	362.7	0.00	0.00	0.00
6,000.0	0.00	0.00	5,980.8	43.7	-360.1	362.7	0.00	0.00	0.00
6,100.0	0.00	0.00	6,080.8	43.7	-360.1	362.7	0.00	0.00	0.00
6,200.0	0.00	0.00	6,180.8	43.7	-360.1	362.7	0.00	0.00	0.00
6,300.0	0.00	0.00	6,280.8	43.7	-360.1	362.7	0.00	0.00	0.00
Ohio Creek									
6,367.2	0.00	0.00	6,348.0	43.7	-360.1	362.7	0.00	0.00	0.00
6,400.0	0.00	0.00	6,380.8	43.7	-360.1	362.7	0.00	0.00	0.00
6,500.0	0.00	0.00	6,480.8	43.7	-360.1	362.7	0.00	0.00	0.00
Williams Fork									
6,517.2	0.00	0.00	6,498.0	43.7	-360.1	362.7	0.00	0.00	0.00
6,600.0	0.00	0.00	6,580.8	43.7	-360.1	362.7	0.00	0.00	0.00
6,700.0	0.00	0.00	6,680.8	43.7	-360.1	362.7	0.00	0.00	0.00
6,800.0	0.00	0.00	6,780.8	43.7	-360.1	362.7	0.00	0.00	0.00
6,900.0	0.00	0.00	6,880.8	43.7	-360.1	362.7	0.00	0.00	0.00
7,000.0	0.00	0.00	6,980.8	43.7	-360.1	362.7	0.00	0.00	0.00
7,100.0	0.00	0.00	7,080.8	43.7	-360.1	362.7	0.00	0.00	0.00
7,200.0	0.00	0.00	7,180.8	43.7	-360.1	362.7	0.00	0.00	0.00
7,300.0	0.00	0.00	7,280.8	43.7	-360.1	362.7	0.00	0.00	0.00
TOG									
7,317.2	0.00	0.00	7,298.0	43.7	-360.1	362.7	0.00	0.00	0.00
7,400.0	0.00	0.00	7,380.8	43.7	-360.1	362.7	0.00	0.00	0.00
7,500.0	0.00	0.00	7,480.8	43.7	-360.1	362.7	0.00	0.00	0.00
7,600.0	0.00	0.00	7,580.8	43.7	-360.1	362.7	0.00	0.00	0.00
7,700.0	0.00	0.00	7,680.8	43.7	-360.1	362.7	0.00	0.00	0.00
7,800.0	0.00	0.00	7,780.8	43.7	-360.1	362.7	0.00	0.00	0.00
7,900.0	0.00	0.00	7,880.8	43.7	-360.1	362.7	0.00	0.00	0.00
8,000.0	0.00	0.00	7,980.8	43.7	-360.1	362.7	0.00	0.00	0.00
8,100.0	0.00	0.00	8,080.8	43.7	-360.1	362.7	0.00	0.00	0.00
8,200.0	0.00	0.00	8,180.8	43.7	-360.1	362.7	0.00	0.00	0.00
8,300.0	0.00	0.00	8,280.8	43.7	-360.1	362.7	0.00	0.00	0.00
8,400.0	0.00	0.00	8,380.8	43.7	-360.1	362.7	0.00	0.00	0.00
8,500.0	0.00	0.00	8,480.8	43.7	-360.1	362.7	0.00	0.00	0.00
8,600.0	0.00	0.00	8,580.8	43.7	-360.1	362.7	0.00	0.00	0.00
8,700.0	0.00	0.00	8,680.8	43.7	-360.1	362.7	0.00	0.00	0.00
8,800.0	0.00	0.00	8,780.8	43.7	-360.1	362.7	0.00	0.00	0.00
8,900.0	0.00	0.00	8,880.8	43.7	-360.1	362.7	0.00	0.00	0.00



Well Planning Report



Database:	EDM 5000 1 Single User Db	Local Co-ordinate Reference:	Well CC 0697-04-08E
Company:	Laramie Energy, LLC	TVD Reference:	Well @ 8639.0usft (RKB 30')
Project:	Garfield County, CO	MD Reference:	Well @ 8639.0usft (RKB 30')
Site:	CC 604-41-32 Pad	North Reference:	True
Well:	CC 0697-04-08E	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #3		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Bulld Rate (°/100usft)	Turn Rate (°/100usft)
Cameo									
8,967.2	0.00	0.00	8,948.0	43.7	-360.1	362.7	0.00	0.00	0.00
9,000.0	0.00	0.00	8,980.8	43.7	-360.1	362.7	0.00	0.00	0.00
9,100.0	0.00	0.00	9,080.8	43.7	-360.1	362.7	0.00	0.00	0.00
Base Cameo Coal									
9,197.2	0.00	0.00	9,178.0	43.7	-360.1	362.7	0.00	0.00	0.00
9,200.0	0.00	0.00	9,180.8	43.7	-360.1	362.7	0.00	0.00	0.00
Rollins									
9,217.2	0.00	0.00	9,198.0	43.7	-360.1	362.7	0.00	0.00	0.00
9,300.0	0.00	0.00	9,280.8	43.7	-360.1	362.7	0.00	0.00	0.00
9,400.0	0.00	0.00	9,380.8	43.7	-360.1	362.7	0.00	0.00	0.00
Cozzette									
9,455.2	0.00	0.00	9,436.0	43.7	-360.1	362.7	0.00	0.00	0.00
9,500.0	0.00	0.00	9,480.8	43.7	-360.1	362.7	0.00	0.00	0.00
9,600.0	0.00	0.00	9,580.8	43.7	-360.1	362.7	0.00	0.00	0.00
9,700.0	0.00	0.00	9,680.8	43.7	-360.1	362.7	0.00	0.00	0.00
Corcoran									
9,728.2	0.00	0.00	9,709.0	43.7	-360.1	362.7	0.00	0.00	0.00
9,800.0	0.00	0.00	9,780.8	43.7	-360.1	362.7	0.00	0.00	0.00
9,900.0	0.00	0.00	9,880.8	43.7	-360.1	362.7	0.00	0.00	0.00
TD @ 9978.2' MD / 9959.0' TVD									
9,978.2	0.00	0.00	9,959.0	43.7	-360.1	362.7	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 0697-04-08E	0.00	0.00	9,959.0	43.7	-360.1	1,639,460.56	2,233,168.25	39.557587	-108.220116
- 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	2,518.4	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 0697-04-08E
Company:	Laramie Energy, LLC	TVD Reference:	Well @ 8639.0usft (RKB 30')
Project:	Garfield County, CO	MD Reference:	Well @ 8639.0usft (RKB 30')
Site:	CC 604-41-32 Pad	North Reference:	True
Well:	CC 0697-04-08E	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #3		

Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
606.4	606.0	Mahogany			
4,667.2	4,648.0	Wasatch 'G' Sand			
6,367.2	6,348.0	Ohio Creek			
6,517.2	6,498.0	Williams Fork			
7,317.2	7,298.0	TOG			
8,967.2	8,948.0	Cameo			
9,197.2	9,178.0	Base Cameo Coal			
9,217.2	9,198.0	Rollins			
9,455.2	9,436.0	Cozzette			
9,728.2	9,709.0	Corcoran			

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
400.0	400.0	0.0	0.0	KOP / (Build 3.00"/100')
605.8	605.4	1.3	-11.0	EOB @ 6.17" Inc / 276.92° Azm
3,772.4	3,753.6	42.4	-349.1	Drop @ 3.00"/100'
3,978.2	3,959.0	43.7	-360.1	EOD @ Vertical
9,978.2	9,959.0	43.7	-360.1	TD @ 9978.2' MD / 9959.0' TVD