

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 0697-04-10E

+N/-S +E/-W Northing Easting Ground Level: 8609.0
0.0 0.0 1639388.97 2233519.78 Latitude 39.557414 Longitude -108.218862

Project: Garfield County, CO

Site: CC 604-41-32 Pad
Well: CC 0697-04-10E
Wellbore: Wellbore #1
Design: Design #3
Latitude: 39.557414
Longitude: -108.218862
Ground Level: 8609.0
Well @ 8639.0usft (RKB 30')



DIRECTIONAL DRILLING



FORMATION TOP DETAILS

TVDPath	MDPath	Formation
604.0	604.4	Mahogany
4729.0	4783.0	Wasatch 'G' Sand
6429.0	6458.6	Ohio Creek
6579.0	6608.6	Williams Fork
7379.0	7408.6	TOG
9029.0	9058.6	Cameo
9259.0	9288.6	Base Cameo Coal
9279.0	9308.6	Rollins
9517.0	9546.6	Cozette
9790.0	9819.6	Corcoran

Azimuths to True North
Magnetic North: 9.77°
Magnetic Field
Strength: 51479.4anT
Dip Angle: 65.59°
Date: 10/4/2017
Model: IGRF2015

REFERENCE INFORMATION

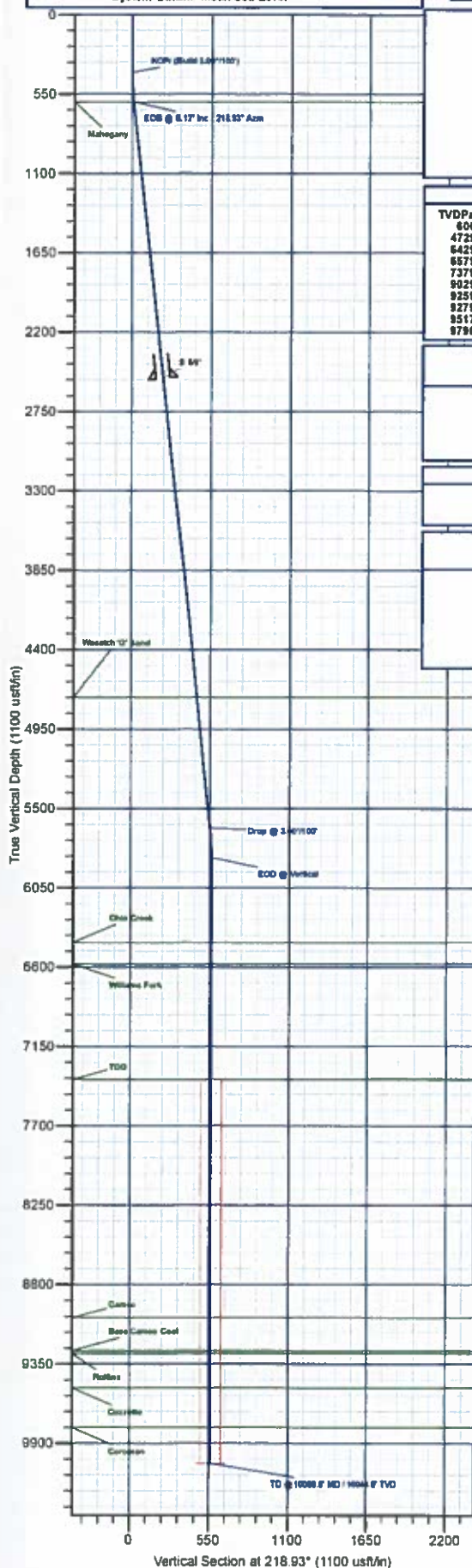
Co-ordinate (N/E) Reference: Well CC 0697-04-10E, True North
Vertical (TVD) Reference: Well @ 8639.0usft (RKB 30')
Section (VS) Reference: Slot - (0.00, 0.00E)
Measured Depth Reference: Well @ 8639.0usft (RKB 30')
Calculation Method: Minimum Curvature

DESIGN TARGET DETAILS

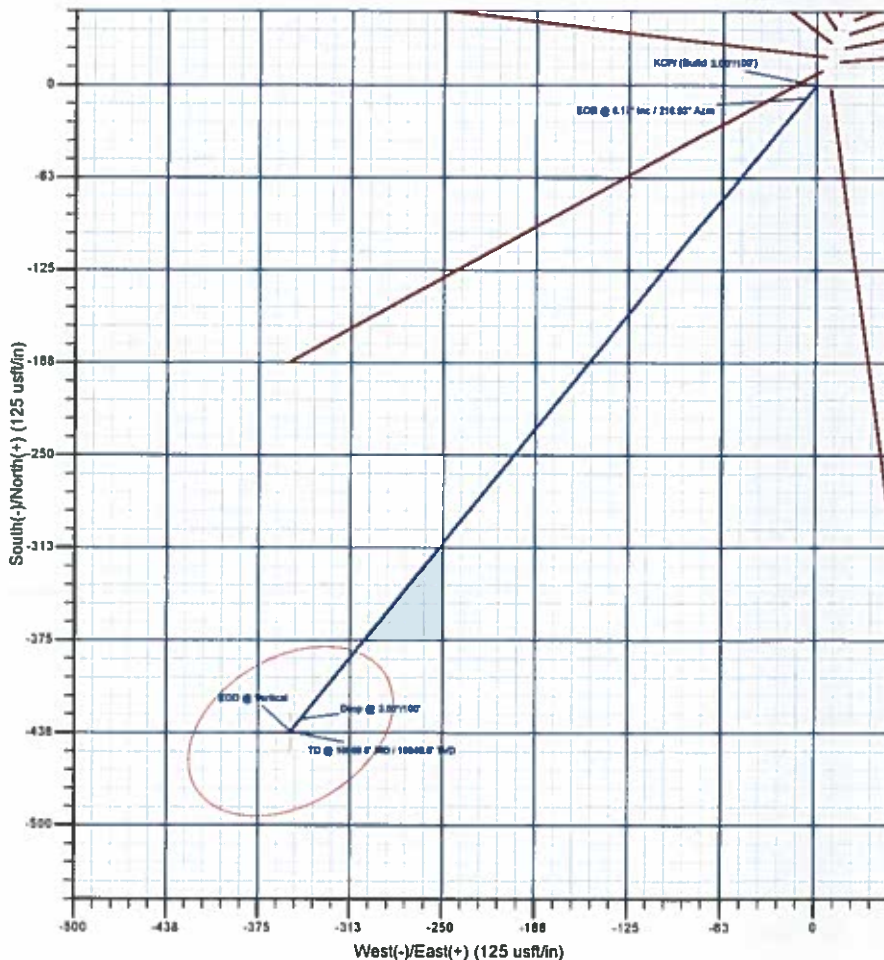
Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
PBHL - CC 0697-04-10E	10040.0	-436.7	-352.7	1638961.01	2233154.18	39.556215	-108.220113

SECTION DETAILS

MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VFace	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 @ 6.12° Inc / 218.93° Azm
604.0	6.12	218.93	603.6	-8.5	-8.5	3.00	218.93	10.9	Drop @ 3.00"/100'
6665.6	6.12	218.93	6636.4	-428.2	-346.9	0.00	0.00	650.5	EOB @ Vertical
6669.6	0.00	0.00	6640.0	-436.7	-352.7	3.00	180.00	661.4	TD @ Vertical
10069.6	0.00	0.00	10040.0	-436.7	-352.7	0.00	0.00	661.4	TD @ 10069.6' MD / 10040.0' TVD



Vertical Section at 218.93° (1100 usft/in)



Plan: Design #3 (CC 0697-04-10E/Wellbore #1)

Created By: Will Jircik Date: 14:39, February 04 2019



Laramie Energy, LLC

Garfield County, CO

CC 604-41-32 Pad

CC 0697-04-10E

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 0697-04-10E
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 0697-04-10E	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:	39.557830
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 0697-04-10E				
Well Position	+N/-S	-78.5 usft	Northing:	1,639,386.97 usft	Latitude: 39.557414
	+E/-W	-26.0 usft	Easting:	2,233,519.78 usft	Longitude: -108.218862
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	51,479.43421649

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	218.93

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	
400.0	0.00	0.00	400.0	0.0	0.0	0.00	0.00	0.00	0.00	
604.0	6.12	218.93	603.6	-8.5	-6.8	3.00	3.00	0.00	218.93	
5,665.6	6.12	218.93	5,636.4	-428.2	-345.9	0.00	0.00	0.00	0.00	
5,869.6	0.00	0.00	5,840.0	-436.7	-352.7	3.00	-3.00	0.00	180.00	
10,069.6	0.00	0.00	10,040.0	-436.7	-352.7	0.00	0.00	0.00	0.00	PBHL - CC 0697-04-1



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 0697-04-10E
 Wellbore: Wellbore #1
 Design: Design #3

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

Well CC 0697-04-10E
 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	218.93	500.0	-2.0	-1.6	2.6	3.00	3.00	0.00
600.0	6.00	218.93	599.6	-8.1	-6.6	10.5	3.00	3.00	0.00
EOB @ 6.12° Inc / 218.93° Azm									
604.0	6.12	218.93	603.6	-8.5	-6.8	10.9	3.00	3.00	0.00
Mahogany									
606.4	6.12	218.93	606.0	-8.7	-7.0	11.1	0.00	0.00	0.00
700.0	6.12	218.93	699.1	-16.4	-13.3	21.1	0.00	0.00	0.00
800.0	6.12	218.93	798.5	-24.7	-20.0	31.8	0.00	0.00	0.00
900.0	6.12	218.93	897.9	-33.0	-26.7	42.4	0.00	0.00	0.00
1,000.0	6.12	218.93	997.4	-41.3	-33.4	53.1	0.00	0.00	0.00
1,100.0	6.12	218.93	1,096.8	-49.6	-40.1	63.8	0.00	0.00	0.00
1,200.0	6.12	218.93	1,196.2	-57.9	-46.8	74.4	0.00	0.00	0.00
1,300.0	6.12	218.93	1,295.6	-66.2	-53.5	85.1	0.00	0.00	0.00
1,400.0	6.12	218.93	1,395.1	-74.5	-60.2	95.7	0.00	0.00	0.00
1,500.0	6.12	218.93	1,494.5	-82.8	-66.9	106.4	0.00	0.00	0.00
1,600.0	6.12	218.93	1,593.9	-91.1	-73.6	117.1	0.00	0.00	0.00
1,700.0	6.12	218.93	1,693.4	-99.4	-80.3	127.7	0.00	0.00	0.00
1,800.0	6.12	218.93	1,792.8	-107.7	-87.0	138.4	0.00	0.00	0.00
1,900.0	6.12	218.93	1,892.2	-115.9	-93.7	149.0	0.00	0.00	0.00
2,000.0	6.12	218.93	1,991.7	-124.2	-100.4	159.7	0.00	0.00	0.00
2,100.0	6.12	218.93	2,091.1	-132.5	-107.0	170.4	0.00	0.00	0.00
2,200.0	6.12	218.93	2,190.5	-140.8	-113.7	181.0	0.00	0.00	0.00
2,300.0	6.12	218.93	2,289.9	-149.1	-120.4	191.7	0.00	0.00	0.00
2,400.0	6.12	218.93	2,389.4	-157.4	-127.1	202.3	0.00	0.00	0.00
2,500.0	6.12	218.93	2,488.8	-165.7	-133.8	213.0	0.00	0.00	0.00
2,600.0	6.12	218.93	2,588.2	-174.0	-140.5	223.7	0.00	0.00	0.00
2,700.0	6.12	218.93	2,687.7	-182.3	-147.2	234.3	0.00	0.00	0.00
2,800.0	6.12	218.93	2,787.1	-190.6	-153.9	245.0	0.00	0.00	0.00
2,900.0	6.12	218.93	2,886.5	-198.9	-160.6	255.7	0.00	0.00	0.00
3,000.0	6.12	218.93	2,986.0	-207.2	-167.3	266.3	0.00	0.00	0.00
3,100.0	6.12	218.93	3,085.4	-215.5	-174.0	277.0	0.00	0.00	0.00
3,200.0	6.12	218.93	3,184.8	-223.8	-180.7	287.6	0.00	0.00	0.00
3,300.0	6.12	218.93	3,284.2	-232.1	-187.4	298.3	0.00	0.00	0.00
3,400.0	6.12	218.93	3,383.7	-240.3	-194.1	309.0	0.00	0.00	0.00
3,500.0	6.12	218.93	3,483.1	-248.6	-200.8	319.6	0.00	0.00	0.00
3,600.0	6.12	218.93	3,582.5	-256.9	-207.5	330.3	0.00	0.00	0.00
3,700.0	6.12	218.93	3,682.0	-265.2	-214.2	340.9	0.00	0.00	0.00
3,800.0	6.12	218.93	3,781.4	-273.5	-220.9	351.6	0.00	0.00	0.00
3,900.0	6.12	218.93	3,880.8	-281.8	-227.6	362.3	0.00	0.00	0.00
4,000.0	6.12	218.93	3,980.3	-290.1	-234.3	372.9	0.00	0.00	0.00
4,100.0	6.12	218.93	4,079.7	-298.4	-241.0	383.6	0.00	0.00	0.00
4,200.0	6.12	218.93	4,179.1	-306.7	-247.7	394.2	0.00	0.00	0.00
4,300.0	6.12	218.93	4,278.5	-315.0	-254.4	404.9	0.00	0.00	0.00
4,400.0	6.12	218.93	4,378.0	-323.3	-261.1	415.6	0.00	0.00	0.00
4,500.0	6.12	218.93	4,477.4	-331.6	-267.8	426.2	0.00	0.00	0.00
4,600.0	6.12	218.93	4,576.8	-339.9	-274.5	436.9	0.00	0.00	0.00
4,700.0	6.12	218.93	4,676.3	-348.2	-281.2	447.5	0.00	0.00	0.00



Well Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well CC 0697-04-10E
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 0697-04-10E	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)
Wasatch 'G' Sand									
4,753.0	6.12	218.93	4,729.0	-352.6	-284.8	453.2	0.00	0.00	0.00
4,800.0	6.12	218.93	4,775.7	-356.5	-287.9	458.2	0.00	0.00	0.00
4,900.0	6.12	218.93	4,875.1	-364.7	-294.6	468.9	0.00	0.00	0.00
5,000.0	6.12	218.93	4,974.6	-373.0	-301.3	479.5	0.00	0.00	0.00
5,100.0	6.12	218.93	5,074.0	-381.3	-308.0	490.2	0.00	0.00	0.00
5,200.0	6.12	218.93	5,173.4	-389.6	-314.7	500.8	0.00	0.00	0.00
5,300.0	6.12	218.93	5,272.9	-397.9	-321.4	511.5	0.00	0.00	0.00
5,400.0	6.12	218.93	5,372.3	-406.2	-328.1	522.2	0.00	0.00	0.00
5,500.0	6.12	218.93	5,471.7	-414.5	-334.8	532.8	0.00	0.00	0.00
5,600.0	6.12	218.93	5,571.1	-422.8	-341.5	543.5	0.00	0.00	0.00
Drop @ 3.00°/100'									
5,665.6	6.12	218.93	5,636.4	-428.2	-345.9	550.5	0.00	0.00	0.00
5,700.0	5.09	218.93	5,670.6	-430.9	-348.0	553.8	3.00	-3.00	0.00
5,800.0	2.09	218.93	5,770.4	-435.7	-351.9	560.1	3.00	-3.00	0.00
EOD @ Vertical									
5,869.6	0.00	0.00	5,840.0	-436.7	-352.7	561.4	3.00	-3.00	0.00
5,900.0	0.00	0.00	5,870.4	-436.7	-352.7	561.4	0.00	0.00	0.00
6,000.0	0.00	0.00	5,970.4	-436.7	-352.7	561.4	0.00	0.00	0.00
6,100.0	0.00	0.00	6,070.4	-436.7	-352.7	561.4	0.00	0.00	0.00
6,200.0	0.00	0.00	6,170.4	-436.7	-352.7	561.4	0.00	0.00	0.00
6,300.0	0.00	0.00	6,270.4	-436.7	-352.7	561.4	0.00	0.00	0.00
6,400.0	0.00	0.00	6,370.4	-436.7	-352.7	561.4	0.00	0.00	0.00
Ohio Creek									
6,458.6	0.00	0.00	6,429.0	-436.7	-352.7	561.4	0.00	0.00	0.00
6,500.0	0.00	0.00	6,470.4	-436.7	-352.7	561.4	0.00	0.00	0.00
6,600.0	0.00	0.00	6,570.4	-436.7	-352.7	561.4	0.00	0.00	0.00
Williams Fork									
6,608.6	0.00	0.00	6,579.0	-436.7	-352.7	561.4	0.00	0.00	0.00
6,700.0	0.00	0.00	6,670.4	-436.7	-352.7	561.4	0.00	0.00	0.00
6,800.0	0.00	0.00	6,770.4	-436.7	-352.7	561.4	0.00	0.00	0.00
6,900.0	0.00	0.00	6,870.4	-436.7	-352.7	561.4	0.00	0.00	0.00
7,000.0	0.00	0.00	6,970.4	-436.7	-352.7	561.4	0.00	0.00	0.00
7,100.0	0.00	0.00	7,070.4	-436.7	-352.7	561.4	0.00	0.00	0.00
7,200.0	0.00	0.00	7,170.4	-436.7	-352.7	561.4	0.00	0.00	0.00
7,300.0	0.00	0.00	7,270.4	-436.7	-352.7	561.4	0.00	0.00	0.00
7,400.0	0.00	0.00	7,370.4	-436.7	-352.7	561.4	0.00	0.00	0.00
TOG									
7,408.6	0.00	0.00	7,379.0	-436.7	-352.7	561.4	0.00	0.00	0.00
7,500.0	0.00	0.00	7,470.4	-436.7	-352.7	561.4	0.00	0.00	0.00
7,600.0	0.00	0.00	7,570.4	-436.7	-352.7	561.4	0.00	0.00	0.00
7,700.0	0.00	0.00	7,670.4	-436.7	-352.7	561.4	0.00	0.00	0.00
7,800.0	0.00	0.00	7,770.4	-436.7	-352.7	561.4	0.00	0.00	0.00
7,900.0	0.00	0.00	7,870.4	-436.7	-352.7	561.4	0.00	0.00	0.00
8,000.0	0.00	0.00	7,970.4	-436.7	-352.7	561.4	0.00	0.00	0.00
8,100.0	0.00	0.00	8,070.4	-436.7	-352.7	561.4	0.00	0.00	0.00
8,200.0	0.00	0.00	8,170.4	-436.7	-352.7	561.4	0.00	0.00	0.00
8,300.0	0.00	0.00	8,270.4	-436.7	-352.7	561.4	0.00	0.00	0.00
8,400.0	0.00	0.00	8,370.4	-436.7	-352.7	561.4	0.00	0.00	0.00
8,500.0	0.00	0.00	8,470.4	-436.7	-352.7	561.4	0.00	0.00	0.00
8,600.0	0.00	0.00	8,570.4	-436.7	-352.7	561.4	0.00	0.00	0.00
8,700.0	0.00	0.00	8,670.4	-436.7	-352.7	561.4	0.00	0.00	0.00
8,800.0	0.00	0.00	8,770.4	-436.7	-352.7	561.4	0.00	0.00	0.00



Well Planning Report



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Site:	CC 604-41-32 Pad	North Reference:	True
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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)	
8,900.0	0.00	0.00	8,870.4	-436.7	-352.7	561.4	0.00	0.00	0.00	
9,000.0	0.00	0.00	8,970.4	-436.7	-352.7	561.4	0.00	0.00	0.00	
Cameo										
9,058.6	0.00	0.00	9,029.0	-436.7	-352.7	561.4	0.00	0.00	0.00	
9,100.0	0.00	0.00	9,070.4	-436.7	-352.7	561.4	0.00	0.00	0.00	
9,200.0	0.00	0.00	9,170.4	-436.7	-352.7	561.4	0.00	0.00	0.00	
Base Cameo Coal										
9,288.6	0.00	0.00	9,259.0	-436.7	-352.7	561.4	0.00	0.00	0.00	
9,300.0	0.00	0.00	9,270.4	-436.7	-352.7	561.4	0.00	0.00	0.00	
Rollins										
9,308.6	0.00	0.00	9,279.0	-436.7	-352.7	561.4	0.00	0.00	0.00	
9,400.0	0.00	0.00	9,370.4	-436.7	-352.7	561.4	0.00	0.00	0.00	
9,500.0	0.00	0.00	9,470.4	-436.7	-352.7	561.4	0.00	0.00	0.00	
Cozzette										
9,546.6	0.00	0.00	9,517.0	-436.7	-352.7	561.4	0.00	0.00	0.00	
9,600.0	0.00	0.00	9,570.4	-436.7	-352.7	561.4	0.00	0.00	0.00	
9,700.0	0.00	0.00	9,670.4	-436.7	-352.7	561.4	0.00	0.00	0.00	
9,800.0	0.00	0.00	9,770.4	-436.7	-352.7	561.4	0.00	0.00	0.00	
Corcoran										
9,819.6	0.00	0.00	9,790.0	-436.7	-352.7	561.4	0.00	0.00	0.00	
9,900.0	0.00	0.00	9,870.4	-436.7	-352.7	561.4	0.00	0.00	0.00	
10,000.0	0.00	0.00	9,970.4	-436.7	-352.7	561.4	0.00	0.00	0.00	
TD @ 10069.6' MD / 10040.0' TVD										
10,069.6	0.00	0.00	10,040.0	-436.7	-352.7	561.4	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 0697-04-10E	0.00	0.00	10,040.0	-436.7	-352.7	1,638,961.01	2,233,154.14	39.556215	-108.220113	
- 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	2,518.6	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 0697-04-10E
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 0697-04-10E	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			
4,753.0	4,729.0	Wasatch 'G' Sand			
6,458.6	6,429.0	Ohio Creek			
6,608.6	6,579.0	Williams Fork			
7,408.6	7,379.0	TOG			
9,058.6	9,029.0	Cameo			
9,288.6	9,259.0	Base Cameo Coal			
9,308.6	9,279.0	Rollins			
9,546.6	9,517.0	Cozzette			
9,819.6	9,790.0	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')
604.0	603.6	-8.5	-6.8	EOB @ 6.12" Inc / 218.93° Azm
5,665.6	5,636.4	-428.2	-345.9	Drop @ 3.00"/100'
5,869.6	5,840.0	-436.7	-352.7	EOD @ Vertical
10,069.6	10,040.0	-436.7	-352.7	TD @ 10069.6' MD / 10040.0' TVD