

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

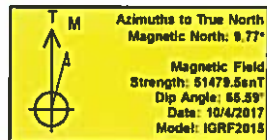
WELL DETAILS: CC 0697-04-06E

+N/-S 0.0 +E/-W 0.0 Northing 1639415.46 Easting 2233530.22 8609.0 Latitude 39.557493 Longitude -108.218828

Project: Garfield County, CO
Site: CC 604-41-32 Pad
Well: CC 0697-04-06E
Wellbore: Wellbore #1
Design: Design #1
Latitude: 39.557493
Longitude: -108.218828
Ground Level: 8609.0
well @ 8633.0usft (24' RKB)

FORMATION TOP DETAILS

TVDPath	MDPath	Formation
4758.0	4776.7	Wasatch 'G' Sand
6458.0	6483.9	Ohio Creek
6608.0	6634.5	Williams Fork
7408.0	7437.4	TOG
9058.0	9067.4	Cameo
9288.0	9317.4	Base Cameo Coal
9308.0	9337.4	Rollins



REFERENCE INFORMATION

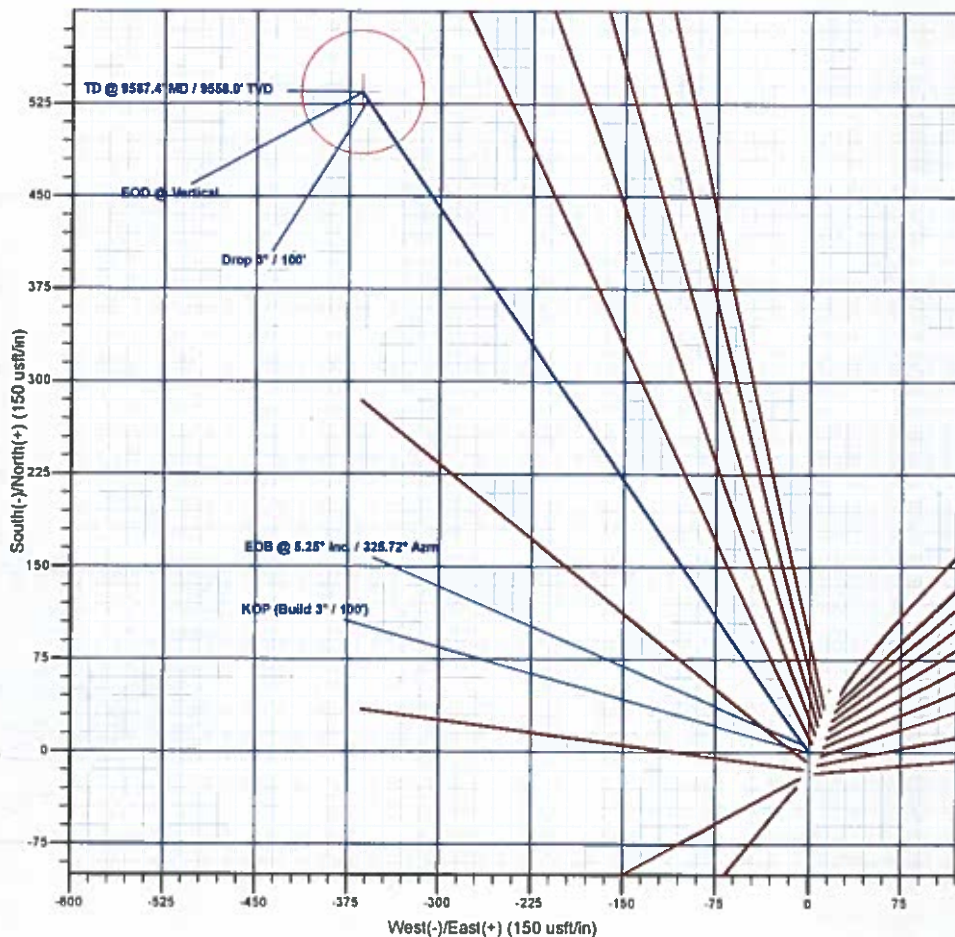
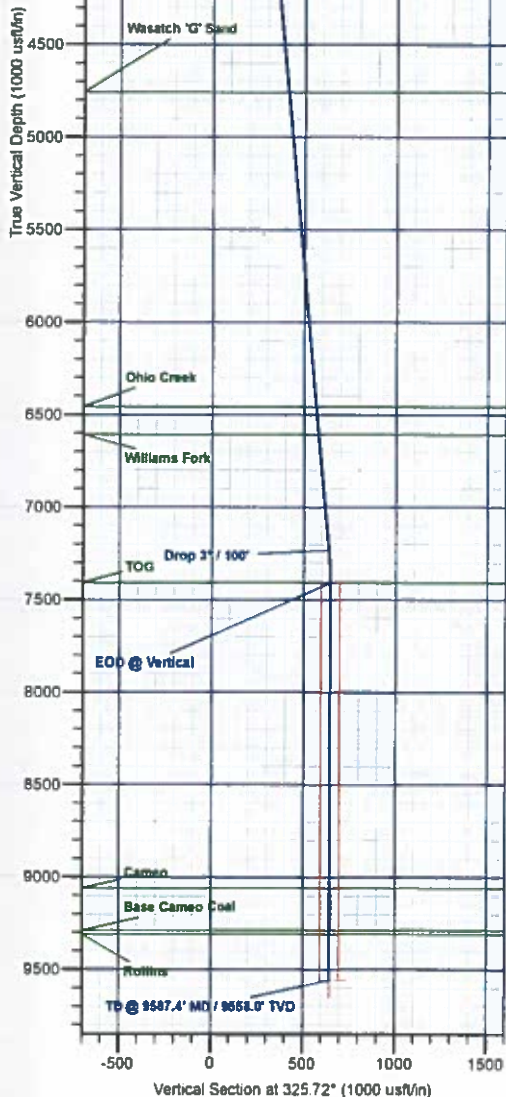
Co-ordinate (N/E) Reference: Well CC 0697-04-06E, True North
Vertical (TVD) Reference: well @ 8633.0usft (24' RKB)
Section (VS) Reference: Slot - (0.0N, 0.0E)
Measured Depth Reference: well @ 8633.0usft (24' RKB)
Calculation Method: Minimum Curvature

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
PBHL - CC 0697-04-06E	9558.0	534.4	-364.3	1639960.46	2233182.10	39.558960	-108.220120

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	KOP (Build 3' / 100')
378.1	5.25	325.72	374.9	6.5	-4.5	3.00	325.72	0.0	EOB @ 5.25° Inc. / 325.72° Azm
7262.9	5.25	325.72	7233.1	527.7	-369.8	0.00	0.00	638.7	Drop 3' / 100'
7437.4	0.00	0.00	7408.0	534.4	-364.3	3.00	180.00	646.7	EOB @ Vertical
9587.4	0.00	0.00	9558.0	534.4	-364.3	0.00	0.00	646.7	TD @ 9587.4' MD / 9558.0' TVD



Plan: Design #1 (CC 0697-04-06E/Wellbore #1)

Created By: Will Jircik

Date: 15:20, October 04 2017



Laramie Energy, LLC

Garfield County, CO

CC 604-41-32 Pad

CC 0697-04-06E

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 0697-04-08E
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 0697-04-08E	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 0697-04-08E			
Well Position	+N/-S	-49.7 usft	Northing:	1,639,415.45 usft
	+E/-W	-16.4 usft	Easting:	2,233,530.22 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	51,479.48101327

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	325.72

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	
375.1	5.25	325.72	374.9	6.6	-4.5	3.00	3.00	0.00	325.72	
7,262.3	5.25	325.72	7,233.1	527.7	-359.8	0.00	0.00	0.00	0.00	
7,437.4	0.00	0.00	7,408.0	534.4	-364.3	3.00	-3.00	0.00	180.00	
9,587.4	0.00	0.00	9,558.0	534.4	-364.3	0.00	0.00	0.00	0.00	PBHL - CC 0697-04-C



Well Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well CC 0697-04-06E
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 0697-04-06E	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	325.72	300.0	2.2	-1.5	2.6	3.00	3.00	0.00
EOB @ 5.25° Inc. / 325.72° Azm									
375.1	5.25	325.72	374.9	6.6	-4.5	8.0	3.00	3.00	0.00
400.0	5.25	325.72	399.7	8.5	-5.8	10.3	0.00	0.00	0.00
500.0	5.25	325.72	499.2	16.1	-11.0	19.5	0.00	0.00	0.00
600.0	5.25	325.72	598.8	23.6	-16.1	28.6	0.00	0.00	0.00
700.0	5.25	325.72	698.4	31.2	-21.3	37.8	0.00	0.00	0.00
800.0	5.25	325.72	798.0	38.8	-26.4	46.9	0.00	0.00	0.00
900.0	5.25	325.72	897.5	46.3	-31.6	56.1	0.00	0.00	0.00
1,000.0	5.25	325.72	997.1	53.9	-36.8	65.2	0.00	0.00	0.00
1,100.0	5.25	325.72	1,096.7	61.5	-41.9	74.4	0.00	0.00	0.00
1,200.0	5.25	325.72	1,196.3	69.0	-47.1	83.6	0.00	0.00	0.00
1,300.0	5.25	325.72	1,295.9	76.6	-52.2	92.7	0.00	0.00	0.00
1,400.0	5.25	325.72	1,395.4	84.2	-57.4	101.9	0.00	0.00	0.00
1,500.0	5.25	325.72	1,495.0	91.7	-62.5	111.0	0.00	0.00	0.00
1,600.0	5.25	325.72	1,594.6	99.3	-67.7	120.2	0.00	0.00	0.00
1,700.0	5.25	325.72	1,694.2	106.9	-72.9	129.3	0.00	0.00	0.00
1,800.0	5.25	325.72	1,793.8	114.4	-78.0	138.5	0.00	0.00	0.00
1,900.0	5.25	325.72	1,893.3	122.0	-83.2	147.7	0.00	0.00	0.00
2,000.0	5.25	325.72	1,992.9	129.6	-88.3	156.8	0.00	0.00	0.00
2,100.0	5.25	325.72	2,092.5	137.1	-93.5	166.0	0.00	0.00	0.00
2,200.0	5.25	325.72	2,192.1	144.7	-98.6	175.1	0.00	0.00	0.00
2,300.0	5.25	325.72	2,291.7	152.3	-103.8	184.3	0.00	0.00	0.00
2,400.0	5.25	325.72	2,391.2	159.8	-109.0	193.4	0.00	0.00	0.00
2,500.0	5.25	325.72	2,490.8	167.4	-114.1	202.6	0.00	0.00	0.00
9 5/8"									
2,524.0	5.25	325.72	2,514.7	169.2	-115.4	204.8	0.00	0.00	0.00
2,600.0	5.25	325.72	2,590.4	175.0	-119.3	211.8	0.00	0.00	0.00
2,700.0	5.25	325.72	2,690.0	182.5	-124.4	220.9	0.00	0.00	0.00
2,800.0	5.25	325.72	2,789.6	190.1	-129.6	230.1	0.00	0.00	0.00
2,900.0	5.25	325.72	2,889.1	197.7	-134.8	239.2	0.00	0.00	0.00
3,000.0	5.25	325.72	2,988.7	205.2	-139.9	248.4	0.00	0.00	0.00
3,100.0	5.25	325.72	3,088.3	212.8	-145.1	257.5	0.00	0.00	0.00
3,200.0	5.25	325.72	3,187.9	220.4	-150.2	266.7	0.00	0.00	0.00
3,300.0	5.25	325.72	3,287.5	227.9	-155.4	275.9	0.00	0.00	0.00
3,400.0	5.25	325.72	3,387.0	235.5	-160.5	285.0	0.00	0.00	0.00
3,500.0	5.25	325.72	3,486.6	243.1	-165.7	294.2	0.00	0.00	0.00
3,600.0	5.25	325.72	3,586.2	250.6	-170.9	303.3	0.00	0.00	0.00
3,700.0	5.25	325.72	3,685.8	258.2	-176.0	312.5	0.00	0.00	0.00
3,800.0	5.25	325.72	3,785.4	265.8	-181.2	321.6	0.00	0.00	0.00
3,900.0	5.25	325.72	3,884.9	273.3	-186.3	330.8	0.00	0.00	0.00
4,000.0	5.25	325.72	3,984.5	280.9	-191.5	340.0	0.00	0.00	0.00
4,100.0	5.25	325.72	4,084.1	288.5	-196.6	349.1	0.00	0.00	0.00
4,200.0	5.25	325.72	4,183.7	296.0	-201.8	358.3	0.00	0.00	0.00
4,300.0	5.25	325.72	4,283.3	303.6	-207.0	367.4	0.00	0.00	0.00
4,400.0	5.25	325.72	4,382.8	311.2	-212.1	376.6	0.00	0.00	0.00
4,500.0	5.25	325.72	4,482.4	318.7	-217.3	385.7	0.00	0.00	0.00
4,600.0	5.25	325.72	4,582.0	326.3	-222.4	394.9	0.00	0.00	0.00
4,700.0	5.25	325.72	4,681.6	333.9	-227.6	404.1	0.00	0.00	0.00



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 0697-04-06E
 Wellbore: Wellbore #1
 Design: Design #1

Local Co-ordinate Reference: Well CC 0697-04-06E
 TVD Reference: well @ 8633.0usft (24' RKB)
 MD Reference: well @ 8633.0usft (24' RKB)
 North Reference: True
 Survey Calculation Method: 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)
Wasatch 'G' Sand									
4,776.7	5.25	325.72	4,758.0	339.7	-231.6	411.1	0.00	0.00	0.00
4,800.0	5.25	325.72	4,781.2	341.4	-232.8	413.2	0.00	0.00	0.00
4,900.0	5.25	325.72	4,880.7	349.0	-237.9	422.4	0.00	0.00	0.00
5,000.0	5.25	325.72	4,980.3	356.6	-243.1	431.5	0.00	0.00	0.00
5,100.0	5.25	325.72	5,079.9	364.1	-248.2	440.7	0.00	0.00	0.00
5,200.0	5.25	325.72	5,179.5	371.7	-253.4	449.8	0.00	0.00	0.00
5,300.0	5.25	325.72	5,279.1	379.3	-258.5	459.0	0.00	0.00	0.00
5,400.0	5.25	325.72	5,378.6	386.8	-263.7	468.2	0.00	0.00	0.00
5,500.0	5.25	325.72	5,478.2	394.4	-268.9	477.3	0.00	0.00	0.00
5,600.0	5.25	325.72	5,577.8	402.0	-274.0	486.5	0.00	0.00	0.00
5,700.0	5.25	325.72	5,677.4	409.5	-279.2	495.6	0.00	0.00	0.00
5,800.0	5.25	325.72	5,777.0	417.1	-284.3	504.8	0.00	0.00	0.00
5,900.0	5.25	325.72	5,876.5	424.7	-289.5	513.9	0.00	0.00	0.00
6,000.0	5.25	325.72	5,976.1	432.2	-294.6	523.1	0.00	0.00	0.00
6,100.0	5.25	325.72	6,075.7	439.8	-299.8	532.3	0.00	0.00	0.00
6,200.0	5.25	325.72	6,175.3	447.4	-305.0	541.4	0.00	0.00	0.00
6,300.0	5.25	325.72	6,274.9	454.9	-310.1	550.6	0.00	0.00	0.00
6,400.0	5.25	325.72	6,374.4	462.5	-315.3	559.7	0.00	0.00	0.00
Ohio Creek									
6,483.9	5.25	325.72	6,458.0	468.8	-319.6	567.4	0.00	0.00	0.00
6,500.0	5.25	325.72	6,474.0	470.1	-320.4	568.9	0.00	0.00	0.00
6,600.0	5.25	325.72	6,573.6	477.6	-325.6	578.0	0.00	0.00	0.00
Williams Fork									
6,634.5	5.25	325.72	6,608.0	480.2	-327.4	581.2	0.00	0.00	0.00
6,700.0	5.25	325.72	6,673.2	485.2	-330.8	587.2	0.00	0.00	0.00
6,800.0	5.25	325.72	6,772.8	492.6	-335.9	596.4	0.00	0.00	0.00
6,900.0	5.25	325.72	6,872.3	500.3	-341.1	605.5	0.00	0.00	0.00
7,000.0	5.25	325.72	6,971.9	507.9	-346.2	614.7	0.00	0.00	0.00
7,100.0	5.25	325.72	7,071.5	515.5	-351.4	623.8	0.00	0.00	0.00
7,200.0	5.25	325.72	7,171.1	523.0	-356.5	633.0	0.00	0.00	0.00
Drop 3° / 100'									
7,262.3	5.25	325.72	7,233.1	527.7	-359.8	638.7	0.00	0.00	0.00
7,300.0	4.12	325.72	7,270.7	530.3	-361.5	641.8	3.00	-3.00	0.00
7,400.0	1.12	325.72	7,370.6	534.1	-364.1	646.3	3.00	-3.00	0.00
EOD @ Vertical - TOG									
7,437.4	0.00	0.00	7,408.0	534.4	-364.3	646.7	3.00	-3.00	0.00
7,500.0	0.00	0.00	7,470.6	534.4	-364.3	646.7	0.00	0.00	0.00
7,600.0	0.00	0.00	7,570.6	534.4	-364.3	646.7	0.00	0.00	0.00
7,700.0	0.00	0.00	7,670.6	534.4	-364.3	646.7	0.00	0.00	0.00
7,800.0	0.00	0.00	7,770.6	534.4	-364.3	646.7	0.00	0.00	0.00
7,900.0	0.00	0.00	7,870.6	534.4	-364.3	646.7	0.00	0.00	0.00
8,000.0	0.00	0.00	7,970.6	534.4	-364.3	646.7	0.00	0.00	0.00
8,100.0	0.00	0.00	8,070.6	534.4	-364.3	646.7	0.00	0.00	0.00
8,200.0	0.00	0.00	8,170.6	534.4	-364.3	646.7	0.00	0.00	0.00
8,300.0	0.00	0.00	8,270.6	534.4	-364.3	646.7	0.00	0.00	0.00
8,400.0	0.00	0.00	8,370.6	534.4	-364.3	646.7	0.00	0.00	0.00
8,500.0	0.00	0.00	8,470.6	534.4	-364.3	646.7	0.00	0.00	0.00
8,600.0	0.00	0.00	8,570.6	534.4	-364.3	646.7	0.00	0.00	0.00
8,700.0	0.00	0.00	8,670.6	534.4	-364.3	646.7	0.00	0.00	0.00
8,800.0	0.00	0.00	8,770.6	534.4	-364.3	646.7	0.00	0.00	0.00
8,900.0	0.00	0.00	8,870.6	534.4	-364.3	646.7	0.00	0.00	0.00
9,000.0	0.00	0.00	8,970.6	534.4	-364.3	646.7	0.00	0.00	0.00



Well Planning Report



Database:	EDM 5000 1 Single User Db	Local Co-ordinate Reference:	Well CC 0697-04-06E
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 0697-04-06E	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)
Cameo									
9,087.4	0.00	0.00	9,058.0	534.4	-364.3	846.7	0.00	0.00	0.00
9,100.0	0.00	0.00	9,070.6	534.4	-364.3	846.7	0.00	0.00	0.00
9,200.0	0.00	0.00	9,170.6	534.4	-364.3	846.7	0.00	0.00	0.00
9,300.0	0.00	0.00	9,270.6	534.4	-364.3	846.7	0.00	0.00	0.00
Base Cameo Coal									
9,317.4	0.00	0.00	9,288.0	534.4	-364.3	846.7	0.00	0.00	0.00
Rollins									
9,337.4	0.00	0.00	9,308.0	534.4	-364.3	846.7	0.00	0.00	0.00
9,400.0	0.00	0.00	9,370.6	534.4	-364.3	846.7	0.00	0.00	0.00
9,500.0	0.00	0.00	9,470.6	534.4	-364.3	846.7	0.00	0.00	0.00
TD @ 9587.4' MD / 9558.0' TVD									
9,587.4	0.00	0.00	9,558.0	534.4	-364.3	846.7	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 0697-04-06E	0.00	0.00	9,558.0	534.4	-364.3	1,639,960.48	2,233,182.10	39.558960	-108.220120
- plan hits target center									
- Circle (radius 50.0)									

Casing Points

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
2,524.0	2,514.7	9 5/8"	9-5/8	14-3/4

Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
4,776.7	4,758.0	Wasatch 'G' Sand			
6,483.9	6,458.0	Ohio Creek			
6,634.5	6,608.0	Williams Fork			
7,437.4	7,408.0	TOG			
9,087.4	9,058.0	Cameo			
9,317.4	9,288.0	Base Cameo Coal			
9,337.4	9,308.0	Rollins			



Well Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well CC 0697-04-06E
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 0697-04-06E	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')
375.1	374.9	6.6	-4.5	EOB @ 5.25° Inc. / 325.72° Azm
7262.3	7233.1	527.7	-359.8	Drop 3° / 100'
7437.4	7408.0	534.4	-364.3	EOD @ Vertical
9587.4	9558.0	534.4	-364.3	TD @ 9587.4' MD / 9558.0' TVD