



Project: Garfield County, CO
 Site: Shell 797-14-01D Pad
 Well: TC 797-10-10E
 Wellbore: A-1
 Design: Design #1
 Latitude: 39.462004
 Longitude: -108.193023
 Ground Level: 8307.0
 well @ 8331.0usft (24' RKB)



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

REFERENCE INFORMATION

Co-ordinate (N/E) Reference: Well TC 797-10-10E, True North
 Vertical (TVD) Reference: well @ 8331.0usft (24' RKB)
 Section (VS) Reference: Slot - (0.0N, 0.0E)
 Measured Depth Reference: well @ 8331.0usft (24' RKB)
 Calculation Method: Minimum Curvature

WELL DETAILS: TC 797-10-10E

+N-S: 0.0 +E-W: 0.0 Northing: 1600792.27 Easting: 2239663.97 Latitude: 39.462004 Longitude: -108.193023

DESIGN TARGET DETAILS

Name	TVD	+N-S	+E-W	Northing	Easting	Latitude	Longitude
PBHL - TC 797-10-10E	8723.0	3217.4	-2344.0	1604077.74	2237416.36	39.460837	-108.201325

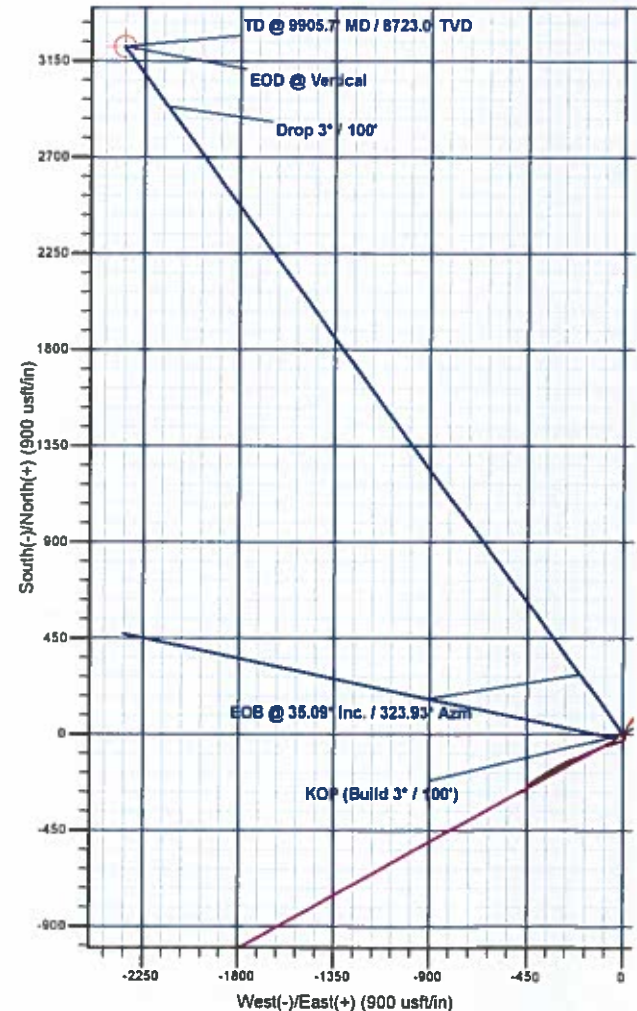
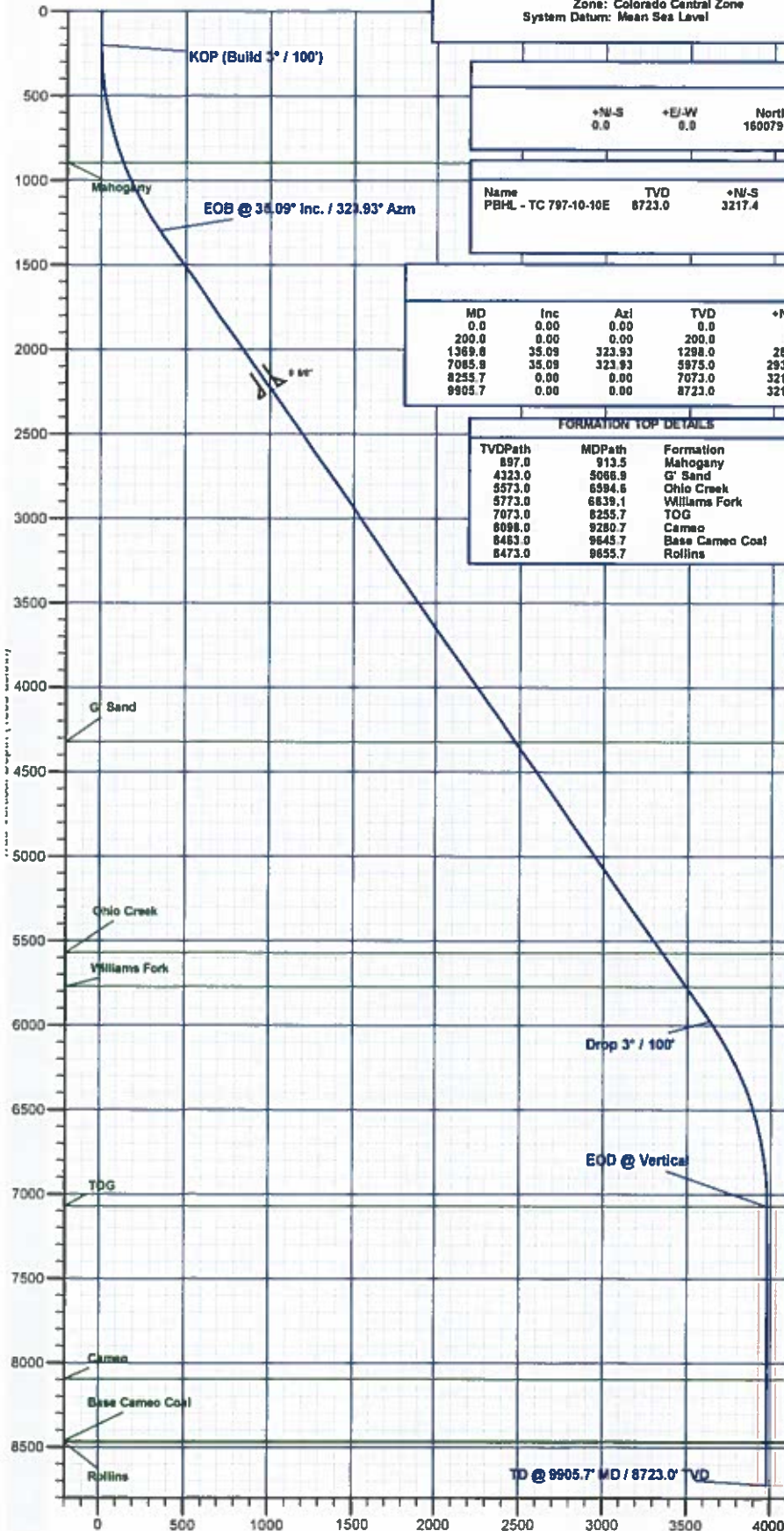
SECTION DETAILS

MD	Inc	Azi	TVD	+N-S	+E-W	Diag	TFace	VSec	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')
1369.6	35.09	323.93	1298.0	280.6	-204.4	3.00	323.93	347.2	EOB @ 35.09° Inc. / 323.93° Azm
7085.9	35.09	323.93	5975.0	2936.6	-2139.6	0.00	0.00	3633.5	Drop 3' / 100'
8255.7	0.00	0.00	7073.0	3217.4	-2344.0	3.00	180.00	3980.7	EOD @ Vertical
9905.7	0.00	0.00	8723.0	3217.4	-2344.0	0.00	0.00	3980.7	TD @ 9905.7' MD / 8723.0' TVD

FORMATION TOP DETAILS

TVDPth	MDPath	Formation
897.0	913.5	Mahogany
4323.0	5066.9	G' Sand
5573.0	6594.6	Ohio Creek
5773.0	6839.1	Williams Fork
7073.0	8255.7	TGG
8098.0	9280.7	Cameo
8483.0	9645.7	Base Cameo Coal
8473.0	9655.7	Rollins

Azimuths to True North
 Magnetic North: 9.71°
 Magnetic Field
 Strength: 51390.4nT
 Dip Angle: 65.50°
 Date: 2/6/2018
 Model: IGRF2015



Plan: Design #1 (TC 797-10-10E/A-1)

Created By: Will Jircik Date: 15:03, February 06 2018



Laramie Energy, LLC

**Garfield County, CO
Shell 797-14-01D Pad
TC 797-10-10E**

A-1

Plan: Design #1

QES Well Planning Report

06 February, 2018





Well Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well TC 797-10-10E
Company:	Laramie Energy, LLC	TVD Reference:	well @ 8331.0usft (24' RKB)
Project:	Garfield County, CO	MD Reference:	well @ 8331.0usft (24' RKB)
Site:	Shell 797-14-01D Pad	North Reference:	True
Well:	TC 797-10-10E	Survey Calculation Method:	Minimum Curvature
Wellbore:	A-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	Shell 797-14-01D Pad			
Site Position:		Northing:	1,600,788.81 usft	Latitude: 39.451994
From:	Lat/Long	Easting:	2,239,657.93 usft	Longitude: -108.193044
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence: -1.70 "

Well	TC 797-10-10E			
Well Position	+N-S	3.6 usft	Northing:	1,600,792.26 usft
	+E-W	5.9 usft	Easting:	2,239,663.97 usft
Position Uncertainty	0.0 usft		Wellhead Elevation:	
			Ground Level:	8,307.0 usft

Wellbore	A-1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	2/6/2018	9.72	65.50	51,390.38573600

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	323.93

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	
200.0	0.00	0.00	200.0	0.0	0.0	0.00	0.00	0.00	0.00	
1,369.8	35.09	323.93	1,298.0	280.6	-204.4	3.00	3.00	0.00	323.93	
7,085.9	35.09	323.93	5,975.0	2,936.8	-2,139.6	0.00	0.00	0.00	0.00	
8,255.7	0.00	0.00	7,073.0	3,217.4	-2,344.0	3.00	-3.00	0.00	180.00	
9,905.7	0.00	0.00	8,723.0	3,217.4	-2,344.0	0.00	0.00	0.00	0.00	PBHL - TC 797-10-10



Well Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well TC 797-10-10E
Company:	Laramie Energy, LLC	TVD Reference:	well @ 8331.0usft (24' RKB)
Project:	Garfield County, CO	MD Reference:	well @ 8331.0usft (24' RKB)
Site:	Shell 797-14-01D Pad	North Reference:	True
Well:	TC 797-10-10E	Survey Calculation Method:	Minimum Curvature
Wellbore:	A-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	323.93	300.0	2.1	-1.5	2.6	3.00	3.00	0.00
400.0	6.00	323.93	399.6	8.5	-6.2	10.5	3.00	3.00	0.00
500.0	9.00	323.93	498.8	19.0	-13.8	23.5	3.00	3.00	0.00
600.0	12.00	323.93	597.1	33.7	-24.6	41.7	3.00	3.00	0.00
700.0	15.00	323.93	694.3	52.6	-38.3	65.1	3.00	3.00	0.00
800.0	18.00	323.93	790.2	75.6	-55.0	93.5	3.00	3.00	0.00
900.0	21.00	323.93	884.4	102.5	-74.7	126.9	3.00	3.00	0.00
Mahogany									
913.5	21.40	323.93	897.0	106.5	-77.6	131.7	3.00	3.00	0.00
1,000.0	24.00	323.93	976.8	133.5	-97.2	165.1	3.00	3.00	0.00
1,100.0	27.00	323.93	1,067.1	168.2	-122.6	208.2	3.00	3.00	0.00
1,200.0	30.00	323.93	1,154.9	206.8	-150.7	255.9	3.00	3.00	0.00
1,300.0	33.00	323.93	1,240.2	249.0	-181.4	308.1	3.00	3.00	0.00
EOB @ 35.09° Inc. / 323.93° Azm									
1,369.8	35.09	323.93	1,298.0	280.6	-204.4	347.2	3.00	3.00	0.00
1,400.0	35.09	323.93	1,322.7	294.7	-214.7	364.6	0.00	0.00	0.00
1,500.0	35.09	323.93	1,404.5	341.1	-248.5	422.0	0.00	0.00	0.00
1,600.0	35.09	323.93	1,486.4	387.6	-282.4	479.5	0.00	0.00	0.00
1,700.0	35.09	323.93	1,568.2	434.1	-316.2	537.0	0.00	0.00	0.00
1,800.0	35.09	323.93	1,650.0	480.5	-350.1	594.5	0.00	0.00	0.00
1,900.0	35.09	323.93	1,731.8	527.0	-383.9	652.0	0.00	0.00	0.00
2,000.0	35.09	323.93	1,813.7	573.5	-417.8	709.5	0.00	0.00	0.00
2,100.0	35.09	323.93	1,895.5	619.9	-451.6	767.0	0.00	0.00	0.00
2,200.0	35.09	323.93	1,977.3	666.4	-485.5	824.5	0.00	0.00	0.00
2,300.0	35.09	323.93	2,059.1	712.9	-519.3	882.0	0.00	0.00	0.00
2,400.0	35.09	323.93	2,140.9	759.3	-553.2	939.5	0.00	0.00	0.00
2,500.0	35.09	323.93	2,222.8	805.8	-587.1	997.0	0.00	0.00	0.00
9 5/8"									
2,524.0	35.09	323.93	2,242.4	817.0	-595.2	1,010.8	0.00	0.00	0.00
2,600.0	35.09	323.93	2,304.6	852.3	-620.9	1,054.5	0.00	0.00	0.00
2,700.0	35.09	323.93	2,386.4	898.7	-654.8	1,112.0	0.00	0.00	0.00
2,800.0	35.09	323.93	2,468.2	945.2	-688.6	1,169.4	0.00	0.00	0.00
2,900.0	35.09	323.93	2,550.0	991.7	-722.5	1,226.9	0.00	0.00	0.00
3,000.0	35.09	323.93	2,631.9	1,038.1	-756.3	1,284.4	0.00	0.00	0.00
3,100.0	35.09	323.93	2,713.7	1,084.6	-790.2	1,341.9	0.00	0.00	0.00
3,200.0	35.09	323.93	2,795.5	1,131.1	-824.0	1,399.4	0.00	0.00	0.00
3,300.0	35.09	323.93	2,877.3	1,177.5	-857.9	1,456.9	0.00	0.00	0.00
3,400.0	35.09	323.93	2,959.1	1,224.0	-891.7	1,514.4	0.00	0.00	0.00
3,500.0	35.09	323.93	3,041.0	1,270.5	-925.6	1,571.9	0.00	0.00	0.00
3,600.0	35.09	323.93	3,122.8	1,317.0	-959.4	1,629.4	0.00	0.00	0.00
3,700.0	35.09	323.93	3,204.6	1,363.4	-993.3	1,686.9	0.00	0.00	0.00
3,800.0	35.09	323.93	3,286.4	1,409.9	-1,027.2	1,744.4	0.00	0.00	0.00
3,900.0	35.09	323.93	3,368.2	1,456.4	-1,061.0	1,801.9	0.00	0.00	0.00
4,000.0	35.09	323.93	3,450.1	1,502.8	-1,094.9	1,859.4	0.00	0.00	0.00
4,100.0	35.09	323.93	3,531.9	1,549.3	-1,128.7	1,916.8	0.00	0.00	0.00
4,200.0	35.09	323.93	3,613.7	1,595.8	-1,162.6	1,974.3	0.00	0.00	0.00
4,300.0	35.09	323.93	3,695.5	1,642.2	-1,196.4	2,031.8	0.00	0.00	0.00
4,400.0	35.09	323.93	3,777.3	1,688.7	-1,230.3	2,089.3	0.00	0.00	0.00
4,500.0	35.09	323.93	3,859.2	1,735.2	-1,264.1	2,146.8	0.00	0.00	0.00
4,600.0	35.09	323.93	3,941.0	1,781.6	-1,298.0	2,204.3	0.00	0.00	0.00



Well Planning Report



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Company:	Laramie Energy, LLC	TVD Reference:	well @ 8331.0usft (24' RKB)
Project:	Garfield County, CO	MD Reference:	well @ 8331.0usft (24' RKB)
Site:	Shell 797-14-01D Pad	North Reference:	True
Well:	TC 797-10-10E	Survey Calculation Method:	Minimum Curvature
Wellbore:	A-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)
4,700.0	35.09	323.93	4,022.8	1,828.1	-1,331.8	2,261.8	0.00	0.00	0.00
4,800.0	35.09	323.93	4,104.6	1,874.6	-1,365.7	2,319.3	0.00	0.00	0.00
4,900.0	35.09	323.93	4,186.5	1,921.0	-1,399.5	2,376.8	0.00	0.00	0.00
5,000.0	35.09	323.93	4,268.3	1,967.5	-1,433.4	2,434.3	0.00	0.00	0.00
G ⁺ Sand									
5,066.9	35.09	323.93	4,323.0	1,998.6	-1,456.0	2,472.7	0.00	0.00	0.00
5,100.0	35.09	323.93	4,350.1	2,014.0	-1,467.3	2,491.8	0.00	0.00	0.00
5,200.0	35.09	323.93	4,431.9	2,060.4	-1,501.1	2,549.3	0.00	0.00	0.00
5,300.0	35.09	323.93	4,513.7	2,106.9	-1,535.0	2,606.8	0.00	0.00	0.00
5,400.0	35.09	323.93	4,595.6	2,153.4	-1,568.8	2,664.2	0.00	0.00	0.00
5,500.0	35.09	323.93	4,677.4	2,199.8	-1,602.7	2,721.7	0.00	0.00	0.00
5,600.0	35.09	323.93	4,759.2	2,246.3	-1,636.5	2,779.2	0.00	0.00	0.00
5,700.0	35.09	323.93	4,841.0	2,292.8	-1,670.4	2,836.7	0.00	0.00	0.00
5,800.0	35.09	323.93	4,922.8	2,339.2	-1,704.2	2,894.2	0.00	0.00	0.00
5,900.0	35.09	323.93	5,004.7	2,385.7	-1,738.1	2,951.7	0.00	0.00	0.00
6,000.0	35.09	323.93	5,086.5	2,432.2	-1,771.9	3,009.2	0.00	0.00	0.00
6,100.0	35.09	323.93	5,168.3	2,478.7	-1,805.8	3,066.7	0.00	0.00	0.00
6,200.0	35.09	323.93	5,250.1	2,525.1	-1,839.6	3,124.2	0.00	0.00	0.00
6,300.0	35.09	323.93	5,331.9	2,571.6	-1,873.5	3,181.7	0.00	0.00	0.00
6,400.0	35.09	323.93	5,413.8	2,618.1	-1,907.4	3,239.2	0.00	0.00	0.00
6,500.0	35.09	323.93	5,495.6	2,664.5	-1,941.2	3,296.7	0.00	0.00	0.00
Ohio Creek									
6,594.6	35.09	323.93	5,573.0	2,708.5	-1,973.2	3,351.1	0.00	0.00	0.00
6,600.0	35.09	323.93	5,577.4	2,711.0	-1,975.1	3,354.2	0.00	0.00	0.00
6,700.0	35.09	323.93	5,659.2	2,757.5	-2,008.9	3,411.6	0.00	0.00	0.00
6,800.0	35.09	323.93	5,741.0	2,803.9	-2,042.8	3,469.1	0.00	0.00	0.00
Williams Fork									
6,839.1	35.09	323.93	5,773.0	2,822.1	-2,056.0	3,491.6	0.00	0.00	0.00
6,900.0	35.09	323.93	5,822.9	2,850.4	-2,076.6	3,526.6	0.00	0.00	0.00
7,000.0	35.09	323.93	5,904.7	2,896.9	-2,110.5	3,584.1	0.00	0.00	0.00
Drop 3° / 100'									
7,085.9	35.09	323.93	5,975.0	2,936.8	-2,139.6	3,633.5	0.00	0.00	0.00
7,100.0	34.67	323.93	5,986.5	2,943.3	-2,144.3	3,641.6	3.00	-3.00	0.00
7,200.0	31.67	323.93	6,070.2	2,987.5	-2,176.5	3,696.3	3.00	-3.00	0.00
7,300.0	28.67	323.93	6,156.7	3,028.1	-2,206.1	3,746.5	3.00	-3.00	0.00
7,400.0	25.67	323.93	6,245.6	3,065.0	-2,233.0	3,792.2	3.00	-3.00	0.00
7,500.0	22.67	323.93	6,336.9	3,098.1	-2,257.1	3,833.1	3.00	-3.00	0.00
7,600.0	19.67	323.93	6,430.1	3,127.3	-2,278.4	3,869.2	3.00	-3.00	0.00
7,700.0	16.67	323.93	6,525.1	3,152.5	-2,296.7	3,900.4	3.00	-3.00	0.00
7,800.0	13.67	323.93	6,621.6	3,173.7	-2,312.1	3,926.6	3.00	-3.00	0.00
7,900.0	10.67	323.93	6,719.3	3,190.7	-2,324.5	3,947.7	3.00	-3.00	0.00
8,000.0	7.67	323.93	6,818.0	3,203.6	-2,333.9	3,963.6	3.00	-3.00	0.00
8,100.0	4.67	323.93	6,917.5	3,212.3	-2,340.3	3,974.4	3.00	-3.00	0.00
8,200.0	1.67	323.93	7,017.3	3,216.8	-2,343.5	3,979.9	3.00	-3.00	0.00
EOD @ Vertical - TOG									
8,255.7	0.00	0.00	7,073.0	3,217.4	-2,344.0	3,980.7	3.00	-3.00	0.00
8,300.0	0.00	0.00	7,117.3	3,217.4	-2,344.0	3,980.7	0.00	0.00	0.00
8,400.0	0.00	0.00	7,217.3	3,217.4	-2,344.0	3,980.7	0.00	0.00	0.00
8,500.0	0.00	0.00	7,317.3	3,217.4	-2,344.0	3,980.7	0.00	0.00	0.00
8,600.0	0.00	0.00	7,417.3	3,217.4	-2,344.0	3,980.7	0.00	0.00	0.00
8,700.0	0.00	0.00	7,517.3	3,217.4	-2,344.0	3,980.7	0.00	0.00	0.00
8,800.0	0.00	0.00	7,617.3	3,217.4	-2,344.0	3,980.7	0.00	0.00	0.00
8,900.0	0.00	0.00	7,717.3	3,217.4	-2,344.0	3,980.7	0.00	0.00	0.00



Well Planning Report



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Company:	Laramie Energy, LLC	TVD Reference:	well @ 8331.0usft (24' RKB)
Project:	Garfield County, CO	MD Reference:	well @ 8331.0usft (24' RKB)
Site:	Shell 797-14-01D Pad	North Reference:	True
Well:	TC 797-10-10E	Survey Calculation Method:	Minimum Curvature
Wellbore:	A-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)	
9,000.0	0.00	0.00	7,817.3	3,217.4	-2,344.0	3,980.7	0.00	0.00	0.00	
9,100.0	0.00	0.00	7,917.3	3,217.4	-2,344.0	3,980.7	0.00	0.00	0.00	
9,200.0	0.00	0.00	8,017.3	3,217.4	-2,344.0	3,980.7	0.00	0.00	0.00	
Cameo										
9,280.7	0.00	0.00	8,098.0	3,217.4	-2,344.0	3,980.7	0.00	0.00	0.00	
9,300.0	0.00	0.00	8,117.3	3,217.4	-2,344.0	3,980.7	0.00	0.00	0.00	
9,400.0	0.00	0.00	8,217.3	3,217.4	-2,344.0	3,980.7	0.00	0.00	0.00	
9,500.0	0.00	0.00	8,317.3	3,217.4	-2,344.0	3,980.7	0.00	0.00	0.00	
9,600.0	0.00	0.00	8,417.3	3,217.4	-2,344.0	3,980.7	0.00	0.00	0.00	
Base Cameo Coal										
9,645.7	0.00	0.00	8,463.0	3,217.4	-2,344.0	3,980.7	0.00	0.00	0.00	
Rollins										
9,655.7	0.00	0.00	8,473.0	3,217.4	-2,344.0	3,980.7	0.00	0.00	0.00	
9,700.0	0.00	0.00	8,517.3	3,217.4	-2,344.0	3,980.7	0.00	0.00	0.00	
9,800.0	0.00	0.00	8,617.3	3,217.4	-2,344.0	3,980.7	0.00	0.00	0.00	
TD @ 9905.7' MD / 8723.0' TVD										
9,905.7	0.00	0.00	8,723.0	3,217.4	-2,344.0	3,980.7	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 - TC 797-10-10E	0.00	0.00	8,723.0	3,217.4	-2,344.0	1,604,077.73	2,237,416.36	39.460837	-108.201325
- plan hits target center									
- Circle (radius 50.0)									

Casing Points					
Measured Depth (usft)	Vertical Depth (usft)	Name		Casing Diameter (")	Hole Diameter (")
2,524.0	2,242.4	9 5/8"		9-5/8	12-1/4

Formations						
Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)	
913.5	897.0	Mahogany				
5,066.9	4,323.0	G' Sand				
6,594.6	5,573.0	Ohio Creek				
6,839.1	5,773.0	Williams Fork				
8,255.7	7,073.0	TOG				
9,280.7	8,098.0	Cameo				
9,645.7	8,463.0	Base Cameo Coal				
9,655.7	8,473.0	Rollins				



Well Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well TC 797-10-10E
Company:	Laramie Energy, LLC	TVD Reference:	well @ 8331.0usft (24' RKB)
Project:	Garfield County, CO	MD Reference:	well @ 8331.0usft (24' RKB)
Site:	Shell 797-14-01D Pad	North Reference:	True
Well:	TC 797-10-10E	Survey Calculation Method:	Minimum Curvature
Wellbore:	A-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')
1,369.8	1,298.0	280.6	-204.4	EOB @ 35.09° Inc. / 323.93° Azm
7,085.9	5,975.0	2,936.8	-2,139.6	Drop 3° / 100'
8,255.7	7,073.0	3,217.4	-2,344.0	EOD @ Vertical
9,905.7	8,723.0	3,217.4	-2,344.0	TD @ 9905.7' MD / 8723.0' TVD