



Laramie Energy, LLC

Mesa County, CO

Piceance 29-07 Pad

Piceance Federal 29-08W

Wellbore #1

Plan: Design #1

QES Well Planning Report

22 September, 2016





Project: Mesa County, CO
 Site: Piceance 29-07 Pad
 Well: Piceance Federal 29-08W
 Wellbore: Wellbore #1
 Design: Design #1
 Latitude: 39.250797
 Longitude: -107.791756
 Ground Level: 7496.0
 well @ 7518.0usft (Patterson #306)



PROJECT DETAILS: Mesa 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 Piceance Federal 29-08W, True North
 Vertical (TVD) Reference: well @ 7518.0usft (Patterson #306)
 Section (VS) Reference: Slot - (0.0N, 0.0E)
 Measured Depth Reference: well @ 7518.0usft (Patterson #306)
 Calculation Method: Minimum Curvature

WELL DETAILS: Piceance Federal 29-08W

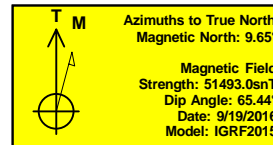
+N/-S	+E/-W	Northing	Easting	Ground Level: 7496.0	Latitude	Longitude
0.0	0.0	1524422.59	2351081.22		39.250797	-107.791756

WELLBORE TARGET DETAILS (MAP CO-ORDINATES AND LAT/LONG)

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
PBHL - Piceance Federal 29-08W	7693.0	-227.5	-2124.5	1524428.71	2348951.69	39.250172	-107.799258

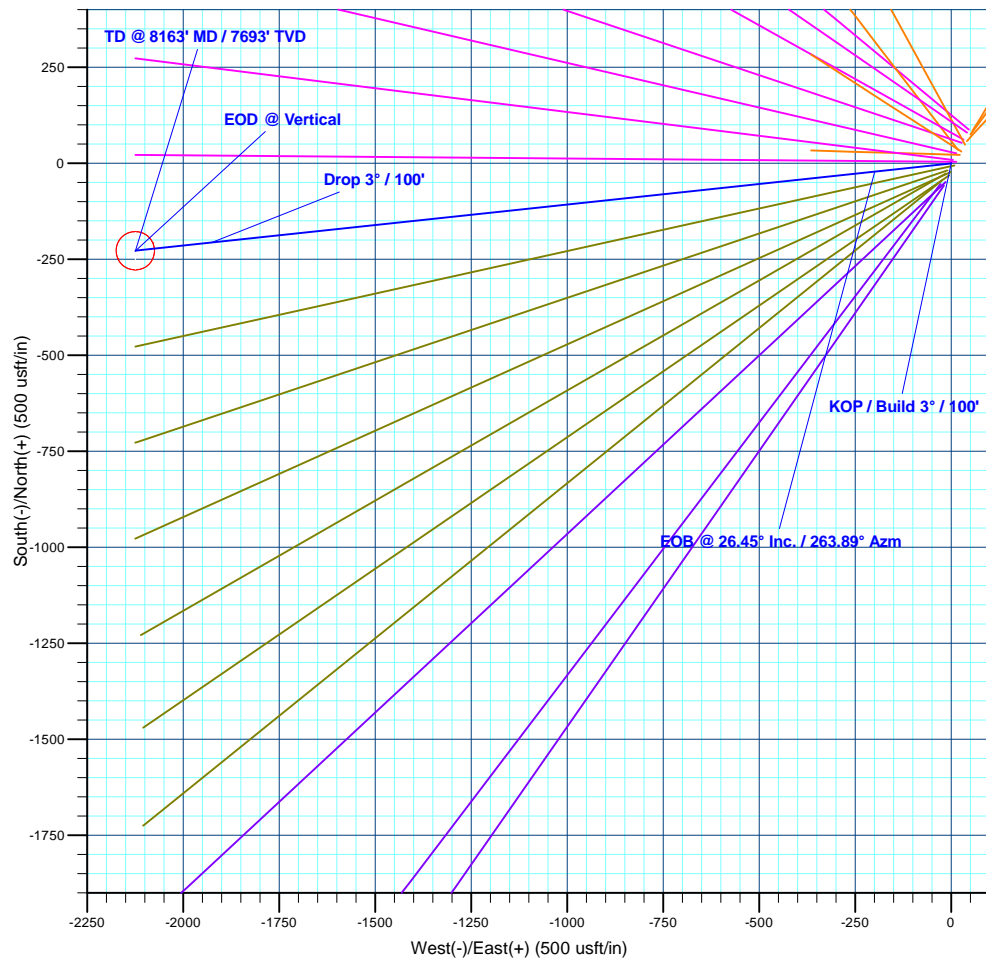
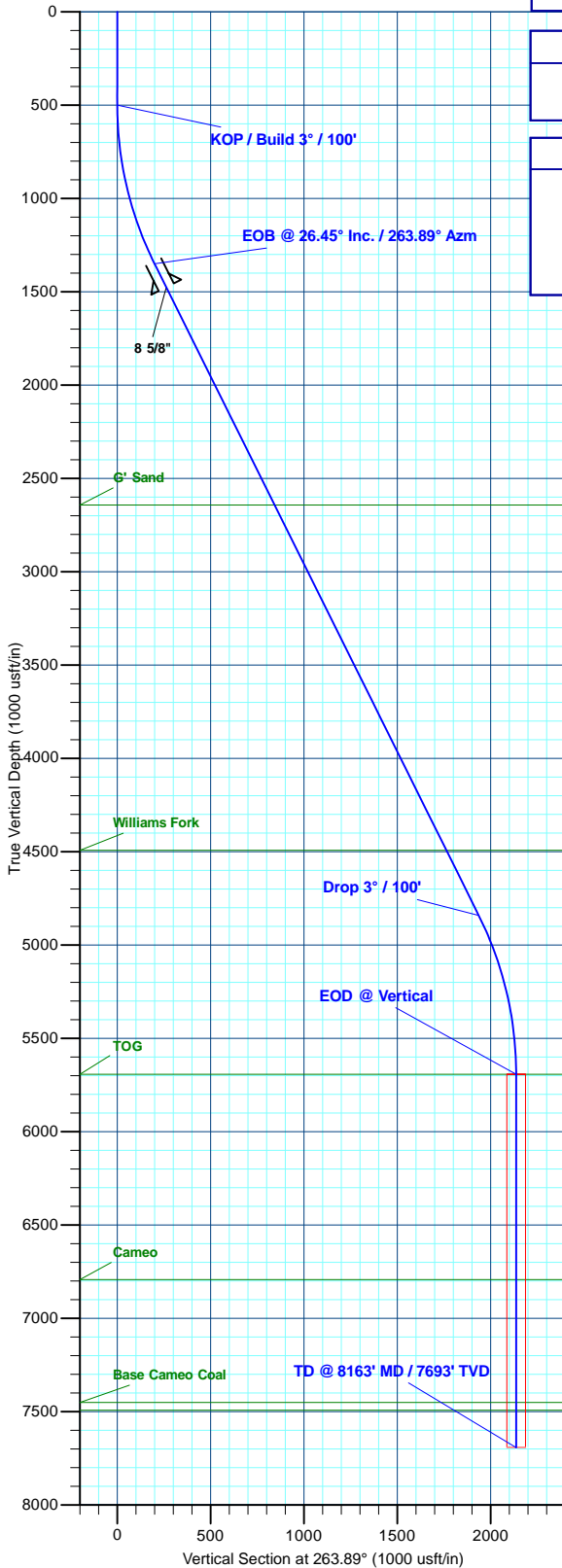
SECTION DETAILS

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	
500.0	0.00	0.00	500.0	0.0	0.0	0.00	0.00	0.0	KOP / Build 3° / 100'
1381.5	26.45	263.89	1350.6	-21.3	-198.7	3.00	263.89	199.9	EOB @ 26.45° Inc. / 263.89° Azm
5281.5	26.45	263.89	4842.4	-206.3	-1925.7	0.00	0.00	1936.8	Drop 3° / 100'
6163.1	0.00	0.00	5693.0	-227.5	-2124.5	3.00	180.00	2136.6	EOD @ Vertical
8163.1	0.00	0.00	7693.0	-227.5	-2124.5	0.00	0.00	2136.6	TD @ 8163' MD / 7693' TVD



FORMATION TOP DETAILS

TVDPath	MDPath	Formation
2643.0	2825.0	G' Sand
4493.0	4891.3	Williams Fork
5693.0	6163.1	TOG
6793.0	7263.1	Cameo
7451.0	7921.1	Base Cameo Coal
7493.0	7963.1	Rollins



Plan: Design #1 (Piceance Federal 29-08W/Wellbore #1)

Created By: Will Jircik Date: 15:24, September 22 2016



Well Planning Report



Database:	EDM5002	Local Co-ordinate Reference:	Well Piceance Federal 29-08W
Company:	Laramie Energy, LLC	TVD Reference:	well @ 7518.0usft (Patterson #306)
Project:	Mesa County, CO	MD Reference:	well @ 7518.0usft (Patterson #306)
Site:	Piceance 29-07 Pad	North Reference:	True
Well:	Piceance Federal 29-08W	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #1		

Project	Mesa 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		Piceance 29-07 Pad			
Site Position:		Northing:	1,524,369.77 usft	Latitude:	39.250650
From:	Lat/Long	Easting:	2,351,052.41 usft	Longitude:	-107.791853
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	-1.45 °

Well		Piceance Federal 29-08W				
Well Position	+N/-S	53.5 usft	Northing:	1,524,422.59 usft	Latitude:	39.250797
	+E/-W	27.5 usft	Easting:	2,351,081.22 usft	Longitude:	-107.791756
Position Uncertainty		0.0 usft	Wellhead Elevation:	0.0 usft	Ground Level:	7,496.0 usft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	9/19/2016	9.65	65.44	51,493

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	263.89

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	
500.0	0.00	0.00	500.0	0.0	0.0	0.00	0.00	0.00	0.00	
1,381.5	26.45	263.89	1,350.6	-21.3	-198.7	3.00	3.00	0.00	263.89	
5,281.5	26.45	263.89	4,842.4	-206.3	-1,925.7	0.00	0.00	0.00	0.00	
6,163.1	0.00	0.00	5,693.0	-227.5	-2,124.5	3.00	-3.00	0.00	180.00	
8,163.1	0.00	0.00	7,693.0	-227.5	-2,124.5	0.00	0.00	0.00	0.00	PBHL - Piceance Fed



Well Planning Report



Database:	EDM5002	Local Co-ordinate Reference:	Well Piceance Federal 29-08W
Company:	Laramie Energy, LLC	TVD Reference:	well @ 7518.0usft (Patterson #306)
Project:	Mesa County, CO	MD Reference:	well @ 7518.0usft (Patterson #306)
Site:	Piceance 29-07 Pad	North Reference:	True
Well:	Piceance Federal 29-08W	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
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
400.0	0.00	0.00	400.0	0.0	0.0	0.0	0.00	0.00	0.00
KOP / Build 3° / 100'									
500.0	0.00	0.00	500.0	0.0	0.0	0.0	0.00	0.00	0.00
600.0	3.00	263.89	600.0	-0.3	-2.6	2.6	3.00	3.00	0.00
700.0	6.00	263.89	699.6	-1.1	-10.4	10.5	3.00	3.00	0.00
800.0	9.00	263.89	798.8	-2.5	-23.4	23.5	3.00	3.00	0.00
900.0	12.00	263.89	897.1	-4.4	-41.5	41.7	3.00	3.00	0.00
1,000.0	15.00	263.89	994.3	-6.9	-64.7	65.1	3.00	3.00	0.00
1,100.0	18.00	263.89	1,090.2	-10.0	-92.9	93.5	3.00	3.00	0.00
1,200.0	21.00	263.89	1,184.4	-13.5	-126.1	126.9	3.00	3.00	0.00
1,300.0	24.00	263.89	1,276.8	-17.6	-164.2	165.1	3.00	3.00	0.00
EOB @ 26.45° Inc. / 263.89° Azm									
1,381.5	26.45	263.89	1,350.6	-21.3	-198.7	199.9	3.00	3.00	0.00
1,400.0	26.45	263.89	1,367.1	-22.2	-206.9	208.1	0.00	0.00	0.00
1,500.0	26.45	263.89	1,456.6	-26.9	-251.2	252.6	0.00	0.00	0.00
8 5/8"									
1,522.0	26.45	263.89	1,476.3	-27.9	-260.9	262.4	0.00	0.00	0.00
1,600.0	26.45	263.89	1,546.2	-31.6	-295.5	297.2	0.00	0.00	0.00
1,700.0	26.45	263.89	1,635.7	-36.4	-339.7	341.7	0.00	0.00	0.00
1,800.0	26.45	263.89	1,725.2	-41.1	-384.0	386.2	0.00	0.00	0.00
1,900.0	26.45	263.89	1,814.8	-45.9	-428.3	430.8	0.00	0.00	0.00
2,000.0	26.45	263.89	1,904.3	-50.6	-472.6	475.3	0.00	0.00	0.00
2,100.0	26.45	263.89	1,993.8	-55.4	-516.9	519.8	0.00	0.00	0.00
2,200.0	26.45	263.89	2,083.4	-60.1	-561.2	564.4	0.00	0.00	0.00
2,300.0	26.45	263.89	2,172.9	-64.8	-605.4	608.9	0.00	0.00	0.00
2,400.0	26.45	263.89	2,262.5	-69.6	-649.7	653.4	0.00	0.00	0.00
2,500.0	26.45	263.89	2,352.0	-74.3	-694.0	698.0	0.00	0.00	0.00
2,600.0	26.45	263.89	2,441.5	-79.1	-738.3	742.5	0.00	0.00	0.00
2,700.0	26.45	263.89	2,531.1	-83.8	-782.6	787.0	0.00	0.00	0.00
2,800.0	26.45	263.89	2,620.6	-88.6	-826.9	831.6	0.00	0.00	0.00
G' Sand									
2,825.0	26.45	263.89	2,643.0	-89.7	-837.9	842.7	0.00	0.00	0.00
2,900.0	26.45	263.89	2,710.1	-93.3	-871.1	876.1	0.00	0.00	0.00
3,000.0	26.45	263.89	2,799.7	-98.0	-915.4	920.7	0.00	0.00	0.00
3,100.0	26.45	263.89	2,889.2	-102.8	-959.7	965.2	0.00	0.00	0.00
3,200.0	26.45	263.89	2,978.7	-107.5	-1,004.0	1,009.7	0.00	0.00	0.00
3,300.0	26.45	263.89	3,068.3	-112.3	-1,048.3	1,054.3	0.00	0.00	0.00
3,400.0	26.45	263.89	3,157.8	-117.0	-1,092.6	1,098.8	0.00	0.00	0.00
3,500.0	26.45	263.89	3,247.3	-121.8	-1,136.8	1,143.3	0.00	0.00	0.00
3,600.0	26.45	263.89	3,336.9	-126.5	-1,181.1	1,187.9	0.00	0.00	0.00
3,700.0	26.45	263.89	3,426.4	-131.2	-1,225.4	1,232.4	0.00	0.00	0.00
3,800.0	26.45	263.89	3,515.9	-136.0	-1,269.7	1,276.9	0.00	0.00	0.00
3,900.0	26.45	263.89	3,605.5	-140.7	-1,314.0	1,321.5	0.00	0.00	0.00
4,000.0	26.45	263.89	3,695.0	-145.5	-1,358.2	1,366.0	0.00	0.00	0.00
4,100.0	26.45	263.89	3,784.5	-150.2	-1,402.5	1,410.5	0.00	0.00	0.00
4,200.0	26.45	263.89	3,874.1	-155.0	-1,446.8	1,455.1	0.00	0.00	0.00
4,300.0	26.45	263.89	3,963.6	-159.7	-1,491.1	1,499.6	0.00	0.00	0.00
4,400.0	26.45	263.89	4,053.2	-164.4	-1,535.4	1,544.2	0.00	0.00	0.00
4,500.0	26.45	263.89	4,142.7	-169.2	-1,579.7	1,588.7	0.00	0.00	0.00
4,600.0	26.45	263.89	4,232.2	-173.9	-1,623.9	1,633.2	0.00	0.00	0.00



Well Planning Report



Database:	EDM5002	Local Co-ordinate Reference:	Well Piceance Federal 29-08W
Company:	Laramie Energy, LLC	TVD Reference:	well @ 7518.0usft (Patterson #306)
Project:	Mesa County, CO	MD Reference:	well @ 7518.0usft (Patterson #306)
Site:	Piceance 29-07 Pad	North Reference:	True
Well:	Piceance Federal 29-08W	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)
4,700.0	26.45	263.89	4,321.8	-178.7	-1,668.2	1,677.8	0.00	0.00	0.00
4,800.0	26.45	263.89	4,411.3	-183.4	-1,712.5	1,722.3	0.00	0.00	0.00
Williams Fork									
4,891.3	26.45	263.89	4,493.0	-187.7	-1,752.9	1,762.9	0.00	0.00	0.00
4,900.0	26.45	263.89	4,500.8	-188.2	-1,756.8	1,766.8	0.00	0.00	0.00
5,000.0	26.45	263.89	4,590.4	-192.9	-1,801.1	1,811.4	0.00	0.00	0.00
5,100.0	26.45	263.89	4,679.9	-197.6	-1,845.4	1,855.9	0.00	0.00	0.00
5,200.0	26.45	263.89	4,769.4	-202.4	-1,889.6	1,900.4	0.00	0.00	0.00
Drop 3° / 100'									
5,281.5	26.45	263.89	4,842.4	-206.3	-1,925.7	1,936.8	0.00	0.00	0.00
5,300.0	25.89	263.89	4,859.0	-207.1	-1,933.8	1,944.9	3.00	-3.00	0.00
5,400.0	22.89	263.89	4,950.1	-211.5	-1,974.9	1,986.2	3.00	-3.00	0.00
5,500.0	19.89	263.89	5,043.2	-215.4	-2,011.2	2,022.7	3.00	-3.00	0.00
5,600.0	16.89	263.89	5,138.1	-218.8	-2,042.5	2,054.2	3.00	-3.00	0.00
5,700.0	13.89	263.89	5,234.5	-221.6	-2,068.9	2,080.7	3.00	-3.00	0.00
5,800.0	10.89	263.89	5,332.1	-223.9	-2,090.3	2,102.2	3.00	-3.00	0.00
5,900.0	7.89	263.89	5,430.8	-225.6	-2,106.5	2,118.5	3.00	-3.00	0.00
6,000.0	4.89	263.89	5,530.1	-226.8	-2,117.5	2,129.7	3.00	-3.00	0.00
6,100.0	1.89	263.89	5,629.9	-227.4	-2,123.4	2,135.6	3.00	-3.00	0.00
EOD @ Vertical - TOG									
6,163.1	0.00	0.00	5,693.0	-227.5	-2,124.5	2,136.6	3.00	-3.00	0.00
6,200.0	0.00	0.00	5,729.9	-227.5	-2,124.5	2,136.6	0.00	0.00	0.00
6,300.0	0.00	0.00	5,829.9	-227.5	-2,124.5	2,136.6	0.00	0.00	0.00
6,400.0	0.00	0.00	5,929.9	-227.5	-2,124.5	2,136.6	0.00	0.00	0.00
6,500.0	0.00	0.00	6,029.9	-227.5	-2,124.5	2,136.6	0.00	0.00	0.00
6,600.0	0.00	0.00	6,129.9	-227.5	-2,124.5	2,136.6	0.00	0.00	0.00
6,700.0	0.00	0.00	6,229.9	-227.5	-2,124.5	2,136.6	0.00	0.00	0.00
6,800.0	0.00	0.00	6,329.9	-227.5	-2,124.5	2,136.6	0.00	0.00	0.00
6,900.0	0.00	0.00	6,429.9	-227.5	-2,124.5	2,136.6	0.00	0.00	0.00
7,000.0	0.00	0.00	6,529.9	-227.5	-2,124.5	2,136.6	0.00	0.00	0.00
7,100.0	0.00	0.00	6,629.9	-227.5	-2,124.5	2,136.6	0.00	0.00	0.00
7,200.0	0.00	0.00	6,729.9	-227.5	-2,124.5	2,136.6	0.00	0.00	0.00
Cameo									
7,263.1	0.00	0.00	6,793.0	-227.5	-2,124.5	2,136.6	0.00	0.00	0.00
7,300.0	0.00	0.00	6,829.9	-227.5	-2,124.5	2,136.6	0.00	0.00	0.00
7,400.0	0.00	0.00	6,929.9	-227.5	-2,124.5	2,136.6	0.00	0.00	0.00
7,500.0	0.00	0.00	7,029.9	-227.5	-2,124.5	2,136.6	0.00	0.00	0.00
7,600.0	0.00	0.00	7,129.9	-227.5	-2,124.5	2,136.6	0.00	0.00	0.00
7,700.0	0.00	0.00	7,229.9	-227.5	-2,124.5	2,136.6	0.00	0.00	0.00
7,800.0	0.00	0.00	7,329.9	-227.5	-2,124.5	2,136.6	0.00	0.00	0.00
7,900.0	0.00	0.00	7,429.9	-227.5	-2,124.5	2,136.6	0.00	0.00	0.00
Base Cameo Coal									
7,921.1	0.00	0.00	7,451.0	-227.5	-2,124.5	2,136.6	0.00	0.00	0.00
Rollins									
7,963.1	0.00	0.00	7,493.0	-227.5	-2,124.5	2,136.6	0.00	0.00	0.00
8,000.0	0.00	0.00	7,529.9	-227.5	-2,124.5	2,136.6	0.00	0.00	0.00
8,100.0	0.00	0.00	7,629.9	-227.5	-2,124.5	2,136.6	0.00	0.00	0.00
TD @ 8163' MD / 7693' TVD									
8,163.1	0.00	0.00	7,693.0	-227.5	-2,124.5	2,136.6	0.00	0.00	0.00



Well Planning Report



Database:	EDM5002	Local Co-ordinate Reference:	Well Piceance Federal 29-08W
Company:	Laramie Energy, LLC	TVD Reference:	well @ 7518.0usft (Patterson #306)
Project:	Mesa County, CO	MD Reference:	well @ 7518.0usft (Patterson #306)
Site:	Piceance 29-07 Pad	North Reference:	True
Well:	Piceance Federal 29-08W	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #1		

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 - Piceance Federal 29-08W	0.00	0.00	7,693.0	-227.5	-2,124.5	1,524,248.71	2,348,951.69	39.250172	-107.799258
- plan hits target center									
- Circle (radius 50.0)									

Casing Points					
Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")	
1,522.0	1,476.3	8 5/8"	8-5/8	11	

Formations						
Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)	
2,825.0	2,643.0	G' Sand		0.00		
4,891.3	4,493.0	Williams Fork		0.00		
6,163.1	5,693.0	TOG		0.00		
7,263.1	6,793.0	Cameo		0.00		
7,921.1	7,451.0	Base Cameo Coal		0.00		
7,963.1	7,493.0	Rollins		0.00		

Plan Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates			
		+N/-S (usft)	+E/-W (usft)	Comment	
500.0	500.0	0.0	0.0	KOP / Build 3° / 100'	
1,381.5	1,350.6	-21.3	-198.7	EOB @ 26.45° Inc. / 263.89° Azm	
5,281.5	4,842.4	-206.3	-1,925.7	Drop 3° / 100'	
6,163.1	5,693.0	-227.5	-2,124.5	EOD @ Vertical	
8,163.1	7,693.0	-227.5	-2,124.5	TD @ 8163' MD / 7693' TVD	