



Laramie Energy, LLC

**Mesa County, CO
Piceance 29-07 Pad
Piceance 29-02E**

Wellbore #1

Plan: Design #1

QES Well Planning Report

22 September, 2016





Project: Mesa County, CO
 Site: Piceance 29-07 Pad
 Well: Piceance 29-02E
 Wellbore: Wellbore #1
 Design: Design #1
 Latitude: 39.251003
 Longitude: -107.791578
 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 29-02E, 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 29-02E

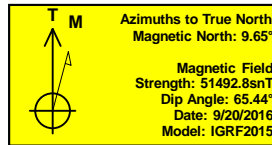
Ground Level: 7496.0
 +N/-S +E/-W Northing Easting Latitude Longitude
 0.0 0.0 1524496.32 2351133.50 39.251003 -107.791578

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

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
PBHL - Piceance 29-02E	7848.0	1224.5	903.6	1525697.66	2352067.69	39.254365	-107.788387

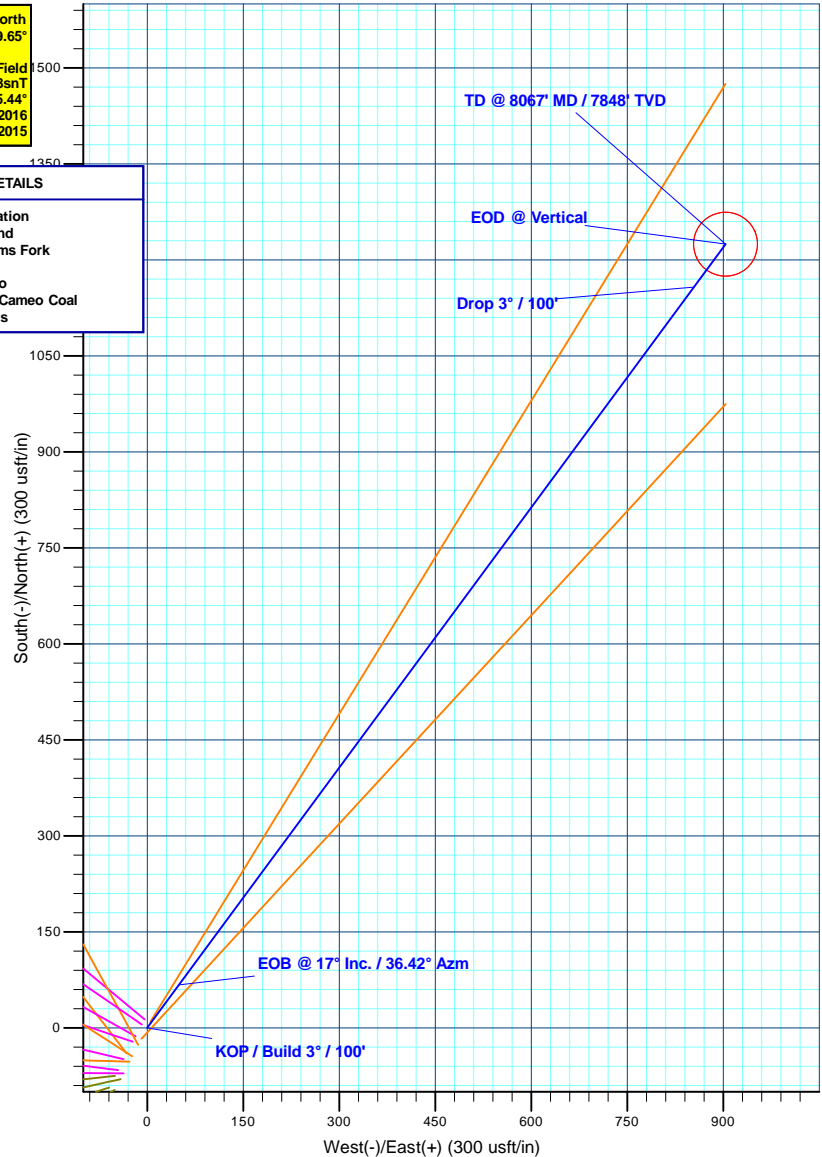
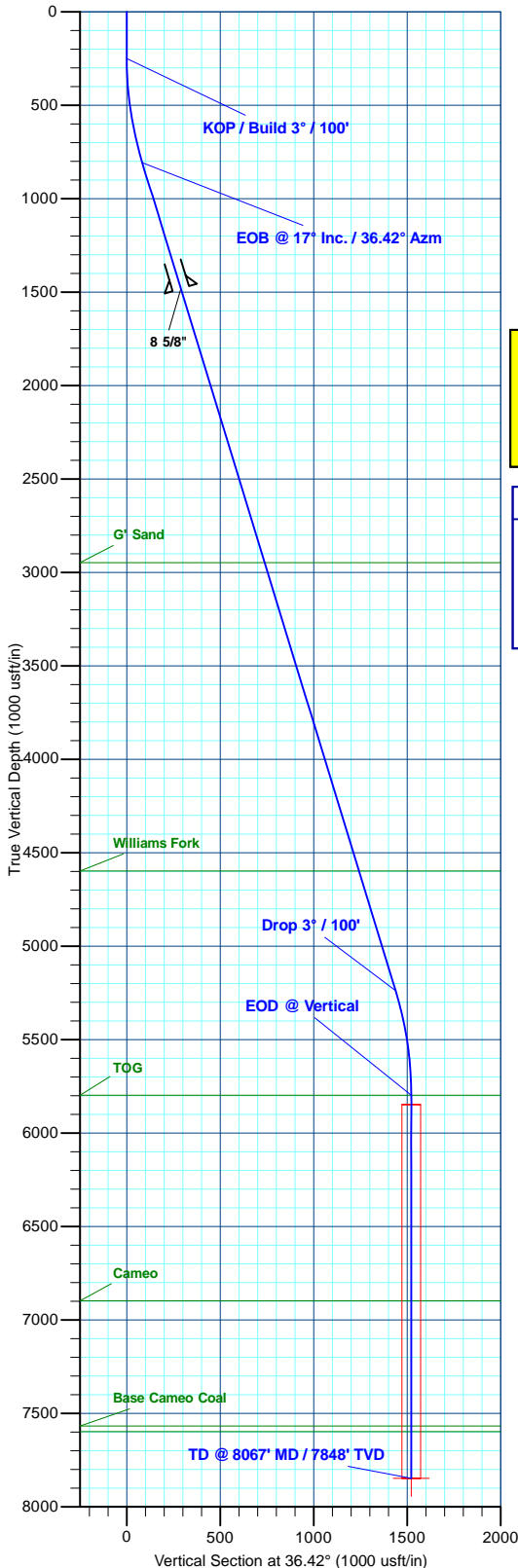
SECTION DETAILS

MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSec	Annotation
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
250.0	0.00	0.00	250.0	0.0	0.0	0.00	0.00	0.0	KOP / Build 3° / 100'
816.7	17.00	36.42	808.4	67.2	49.6	3.00	36.42	83.5	EOB @ 17° Inc. / 36.42° Azm
5450.3	17.00	36.42	5239.6	1157.4	854.0	0.00	0.00	1438.4	Drop 3° / 100'
6017.1	0.00	0.00	5798.0	1224.5	903.6	3.00	180.00	1521.8	EOD @ Vertical
8067.1	0.00	0.00	7848.0	1224.5	903.6	0.00	0.00	1521.8	TD @ 8067' MD / 7848' TVD



FORMATION TOP DETAILS

TVDPath	MDPath	Formation
2948.0	3054.1	G' Sand
4598.0	4779.5	Williams Fork
5798.0	6017.1	TOG
6898.0	7117.1	Cameo
7568.0	7787.1	Base Cameo Coal
7598.0	7817.1	Rollins



Plan: Design #1 (Piceance 29-02E/Wellbore #1)

Created By: Will Jircik Date: 9:02, September 22 2016



Well Planning Report



Database:	EDM5002	Local Co-ordinate Reference:	Well Piceance 29-02E
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 29-02E	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	
From:		Easting:		2,351,052.41 usft	
Position Uncertainty:		Slot Radius:		Grid Convergence:	
Lat/Long		0.0 usft		13-3/16 "	
				39.250650	
				-107.791853	
				-1.45 °	

Well		Piceance 29-02E				
Well Position	+N/-S	128.6 usft	Northing:	1,524,496.32 usft	Latitude:	39.251003
	+E/-W	77.9 usft	Easting:	2,351,133.50 usft	Longitude:	-107.791578
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	9/20/2016	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	36.42

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	
250.0	0.00	0.00	250.0	0.0	0.0	0.00	0.00	0.00	0.00	
816.7	17.00	36.42	808.4	67.2	49.6	3.00	3.00	0.00	36.42	
5,450.3	17.00	36.42	5,239.6	1,157.4	854.0	0.00	0.00	0.00	0.00	
6,017.1	0.00	0.00	5,798.0	1,224.5	903.6	3.00	-3.00	0.00	180.00	
8,067.1	0.00	0.00	7,848.0	1,224.5	903.6	0.00	0.00	0.00	0.00	PBHL - Piceance 29-(



Well Planning Report



Database:	EDM5002	Local Co-ordinate Reference:	Well Piceance 29-02E
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 29-02E	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
KOP / Build 3° / 100'									
250.0	0.00	0.00	250.0	0.0	0.0	0.0	0.00	0.00	0.00
300.0	1.50	36.42	300.0	0.5	0.4	0.7	3.00	3.00	0.00
400.0	4.50	36.42	399.8	4.7	3.5	5.9	3.00	3.00	0.00
500.0	7.50	36.42	499.3	13.1	9.7	16.3	3.00	3.00	0.00
600.0	10.50	36.42	598.0	25.7	19.0	32.0	3.00	3.00	0.00
700.0	13.50	36.42	695.8	42.5	31.3	52.8	3.00	3.00	0.00
800.0	16.50	36.42	792.4	63.3	46.7	78.6	3.00	3.00	0.00
EOB @ 17° Inc. / 36.42° Azm									
816.7	17.00	36.42	808.4	67.2	49.6	83.5	3.00	3.00	0.00
900.0	17.00	36.42	888.1	86.8	64.0	107.8	0.00	0.00	0.00
1,000.0	17.00	36.42	983.7	110.3	81.4	137.1	0.00	0.00	0.00
1,100.0	17.00	36.42	1,079.3	133.8	98.7	166.3	0.00	0.00	0.00
1,200.0	17.00	36.42	1,175.0	157.3	116.1	195.5	0.00	0.00	0.00
1,300.0	17.00	36.42	1,270.6	180.9	133.5	224.8	0.00	0.00	0.00
1,400.0	17.00	36.42	1,366.2	204.4	150.8	254.0	0.00	0.00	0.00
1,500.0	17.00	36.42	1,461.9	227.9	168.2	283.3	0.00	0.00	0.00
8 5/8"									
1,522.0	17.00	36.42	1,482.9	233.1	172.0	289.7	0.00	0.00	0.00
1,600.0	17.00	36.42	1,557.5	251.5	185.5	312.5	0.00	0.00	0.00
1,700.0	17.00	36.42	1,653.1	275.0	202.9	341.7	0.00	0.00	0.00
1,800.0	17.00	36.42	1,748.7	298.5	220.3	371.0	0.00	0.00	0.00
1,900.0	17.00	36.42	1,844.4	322.0	237.6	400.2	0.00	0.00	0.00
2,000.0	17.00	36.42	1,940.0	345.6	255.0	429.5	0.00	0.00	0.00
2,100.0	17.00	36.42	2,035.6	369.1	272.4	458.7	0.00	0.00	0.00
2,200.0	17.00	36.42	2,131.3	392.6	289.7	487.9	0.00	0.00	0.00
2,300.0	17.00	36.42	2,226.9	416.1	307.1	517.2	0.00	0.00	0.00
2,400.0	17.00	36.42	2,322.5	439.7	324.4	546.4	0.00	0.00	0.00
2,500.0	17.00	36.42	2,418.2	463.2	341.8	575.7	0.00	0.00	0.00
2,600.0	17.00	36.42	2,513.8	486.7	359.2	604.9	0.00	0.00	0.00
2,700.0	17.00	36.42	2,609.4	510.3	376.5	634.1	0.00	0.00	0.00
2,800.0	17.00	36.42	2,705.0	533.8	393.9	663.4	0.00	0.00	0.00
2,900.0	17.00	36.42	2,800.7	557.3	411.3	692.6	0.00	0.00	0.00
3,000.0	17.00	36.42	2,896.3	580.8	428.6	721.9	0.00	0.00	0.00
G' Sand									
3,054.1	17.00	36.42	2,948.0	593.6	438.0	737.7	0.00	0.00	0.00
3,100.0	17.00	36.42	2,991.9	604.4	446.0	751.1	0.00	0.00	0.00
3,200.0	17.00	36.42	3,087.6	627.9	463.3	780.3	0.00	0.00	0.00
3,300.0	17.00	36.42	3,183.2	651.4	480.7	809.6	0.00	0.00	0.00
3,400.0	17.00	36.42	3,278.8	675.0	498.1	838.8	0.00	0.00	0.00
3,500.0	17.00	36.42	3,374.4	698.5	515.4	868.1	0.00	0.00	0.00
3,600.0	17.00	36.42	3,470.1	722.0	532.8	897.3	0.00	0.00	0.00
3,700.0	17.00	36.42	3,565.7	745.5	550.1	926.5	0.00	0.00	0.00
3,800.0	17.00	36.42	3,661.3	769.1	567.5	955.8	0.00	0.00	0.00
3,900.0	17.00	36.42	3,757.0	792.6	584.9	985.0	0.00	0.00	0.00
4,000.0	17.00	36.42	3,852.6	816.1	602.2	1,014.3	0.00	0.00	0.00
4,100.0	17.00	36.42	3,948.2	839.7	619.6	1,043.5	0.00	0.00	0.00
4,200.0	17.00	36.42	4,043.9	863.2	637.0	1,072.7	0.00	0.00	0.00
4,300.0	17.00	36.42	4,139.5	886.7	654.3	1,102.0	0.00	0.00	0.00
4,400.0	17.00	36.42	4,235.1	910.2	671.7	1,131.2	0.00	0.00	0.00
4,500.0	17.00	36.42	4,330.7	933.8	689.0	1,160.5	0.00	0.00	0.00



Well Planning Report



Database:	EDM5002	Local Co-ordinate Reference:	Well Piceance 29-02E
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 29-02E	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)
4,600.0	17.00	36.42	4,426.4	957.3	706.4	1,189.7	0.00	0.00	0.00
4,700.0	17.00	36.42	4,522.0	980.8	723.8	1,218.9	0.00	0.00	0.00
Williams Fork									
4,779.5	17.00	36.42	4,598.0	999.5	737.6	1,242.2	0.00	0.00	0.00
4,800.0	17.00	36.42	4,617.6	1,004.3	741.1	1,248.2	0.00	0.00	0.00
4,900.0	17.00	36.42	4,713.3	1,027.9	758.5	1,277.4	0.00	0.00	0.00
5,000.0	17.00	36.42	4,808.9	1,051.4	775.8	1,306.7	0.00	0.00	0.00
5,100.0	17.00	36.42	4,904.5	1,074.9	793.2	1,335.9	0.00	0.00	0.00
5,200.0	17.00	36.42	5,000.2	1,098.5	810.6	1,365.1	0.00	0.00	0.00
5,300.0	17.00	36.42	5,095.8	1,122.0	827.9	1,394.4	0.00	0.00	0.00
5,400.0	17.00	36.42	5,191.4	1,145.5	845.3	1,423.6	0.00	0.00	0.00
Drop 3° / 100'									
5,450.3	17.00	36.42	5,239.6	1,157.4	854.0	1,438.4	0.00	0.00	0.00
5,500.0	15.51	36.42	5,287.2	1,168.5	862.3	1,452.3	3.00	-3.00	0.00
5,600.0	12.51	36.42	5,384.2	1,188.0	876.7	1,476.5	3.00	-3.00	0.00
5,700.0	9.51	36.42	5,482.4	1,203.4	888.0	1,495.6	3.00	-3.00	0.00
5,800.0	6.51	36.42	5,581.4	1,214.6	896.3	1,509.5	3.00	-3.00	0.00
5,900.0	3.51	36.42	5,681.0	1,221.6	901.5	1,518.2	3.00	-3.00	0.00
6,000.0	0.51	36.42	5,780.9	1,224.5	903.5	1,521.7	3.00	-3.00	0.00
EOD @ Vertical - TOG									
6,017.1	0.00	0.00	5,798.0	1,224.5	903.6	1,521.8	3.00	-3.00	0.00
6,100.0	0.00	0.00	5,880.9	1,224.5	903.6	1,521.8	0.00	0.00	0.00
6,200.0	0.00	0.00	5,980.9	1,224.5	903.6	1,521.8	0.00	0.00	0.00
6,300.0	0.00	0.00	6,080.9	1,224.5	903.6	1,521.8	0.00	0.00	0.00
6,400.0	0.00	0.00	6,180.9	1,224.5	903.6	1,521.8	0.00	0.00	0.00
6,500.0	0.00	0.00	6,280.9	1,224.5	903.6	1,521.8	0.00	0.00	0.00
6,600.0	0.00	0.00	6,380.9	1,224.5	903.6	1,521.8	0.00	0.00	0.00
6,700.0	0.00	0.00	6,480.9	1,224.5	903.6	1,521.8	0.00	0.00	0.00
6,800.0	0.00	0.00	6,580.9	1,224.5	903.6	1,521.8	0.00	0.00	0.00
6,900.0	0.00	0.00	6,680.9	1,224.5	903.6	1,521.8	0.00	0.00	0.00
7,000.0	0.00	0.00	6,780.9	1,224.5	903.6	1,521.8	0.00	0.00	0.00
7,100.0	0.00	0.00	6,880.9	1,224.5	903.6	1,521.8	0.00	0.00	0.00
Cameo									
7,117.1	0.00	0.00	6,898.0	1,224.5	903.6	1,521.8	0.00	0.00	0.00
7,200.0	0.00	0.00	6,980.9	1,224.5	903.6	1,521.8	0.00	0.00	0.00
7,300.0	0.00	0.00	7,080.9	1,224.5	903.6	1,521.8	0.00	0.00	0.00
7,400.0	0.00	0.00	7,180.9	1,224.5	903.6	1,521.8	0.00	0.00	0.00
7,500.0	0.00	0.00	7,280.9	1,224.5	903.6	1,521.8	0.00	0.00	0.00
7,600.0	0.00	0.00	7,380.9	1,224.5	903.6	1,521.8	0.00	0.00	0.00
7,700.0	0.00	0.00	7,480.9	1,224.5	903.6	1,521.8	0.00	0.00	0.00
Base Cameo Coal									
7,787.1	0.00	0.00	7,568.0	1,224.5	903.6	1,521.8	0.00	0.00	0.00
7,800.0	0.00	0.00	7,580.9	1,224.5	903.6	1,521.8	0.00	0.00	0.00
Rollins									
7,817.1	0.00	0.00	7,598.0	1,224.5	903.6	1,521.8	0.00	0.00	0.00
7,900.0	0.00	0.00	7,680.9	1,224.5	903.6	1,521.8	0.00	0.00	0.00
8,000.0	0.00	0.00	7,780.9	1,224.5	903.6	1,521.8	0.00	0.00	0.00
TD @ 8067' MD / 7848' TVD									
8,067.1	0.00	0.00	7,848.0	1,224.5	903.6	1,521.8	0.00	0.00	0.00



Well Planning Report



Database:	EDM5002	Local Co-ordinate Reference:	Well Piceance 29-02E
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 29-02E	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #1		

Design Targets									
Target Name									
- hit/miss target	Dip Angle	Dip Dir.	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
- Shape	(°)	(°)	(usft)	(usft)	(usft)	(usft)	(usft)		
PBHL - Piceance 29-02E	0.00	0.00	7,848.0	1,224.5	903.6	1,525,697.67	2,352,067.69	39.254365	-107.788387
- plan hits target center									
- Circle (radius 50.0)									

Casing Points				
Measured Depth	Vertical Depth		Casing Diameter	Hole Diameter
(usft)	(usft)	Name	(")	(")
1,522.0	1,482.9	8 5/8"	8-5/8	11

Formations					
Measured Depth	Vertical Depth			Dip	Dip Direction
(usft)	(usft)	Name	Lithology	(°)	(°)
3,054.1	2,948.0	G' Sand		0.00	
4,779.5	4,598.0	Williams Fork		0.00	
6,017.1	5,798.0	TOG		0.00	
7,117.1	6,898.0	Cameo		0.00	
7,787.1	7,568.0	Base Cameo Coal		0.00	
7,817.1	7,598.0	Rollins		0.00	

Plan Annotations					
Measured Depth	Vertical Depth	Local Coordinates			
(usft)	(usft)	+N/-S	+E/-W	Comment	
(usft)	(usft)	(usft)	(usft)		
250.0	250.0	0.0	0.0	KOP / Build 3° / 100'	
816.7	808.4	67.2	49.6	EOB @ 17° Inc. / 36.42° Azm	
5,450.3	5,239.6	1,157.4	854.0	Drop 3° / 100'	
6,017.1	5,798.0	1,224.5	903.6	EOD @ Vertical	
8,067.1	7,848.0	1,224.5	903.6	TD @ 8067' MD / 7848' TVD	