



Laramie Energy, LLC

**Mesa County, CO
Piceance 29-07 Pad
Piceance 29-03E**

Wellbore #1

Plan: Design #1

QES Well Planning Report

22 September, 2016





Project: Mesa County, CO
 Site: Piceance 29-07 Pad
 Well: Piceance 29-03E
 Wellbore: Wellbore #1
 Design: Design #1
 Latitude: 39.250956
 Longitude: -107.791611
 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 29-03E, 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 29-03E

Ground Level: 7496.0

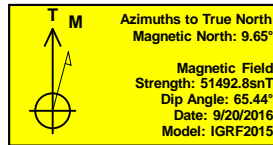
+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
0.0	0.0	1524479.44	2351123.72	39.250956	-107.791611

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

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
Piceance 29-03E	7840.0	991.8	913.2	1525447.88	2352061.68	39.253679	-107.788386

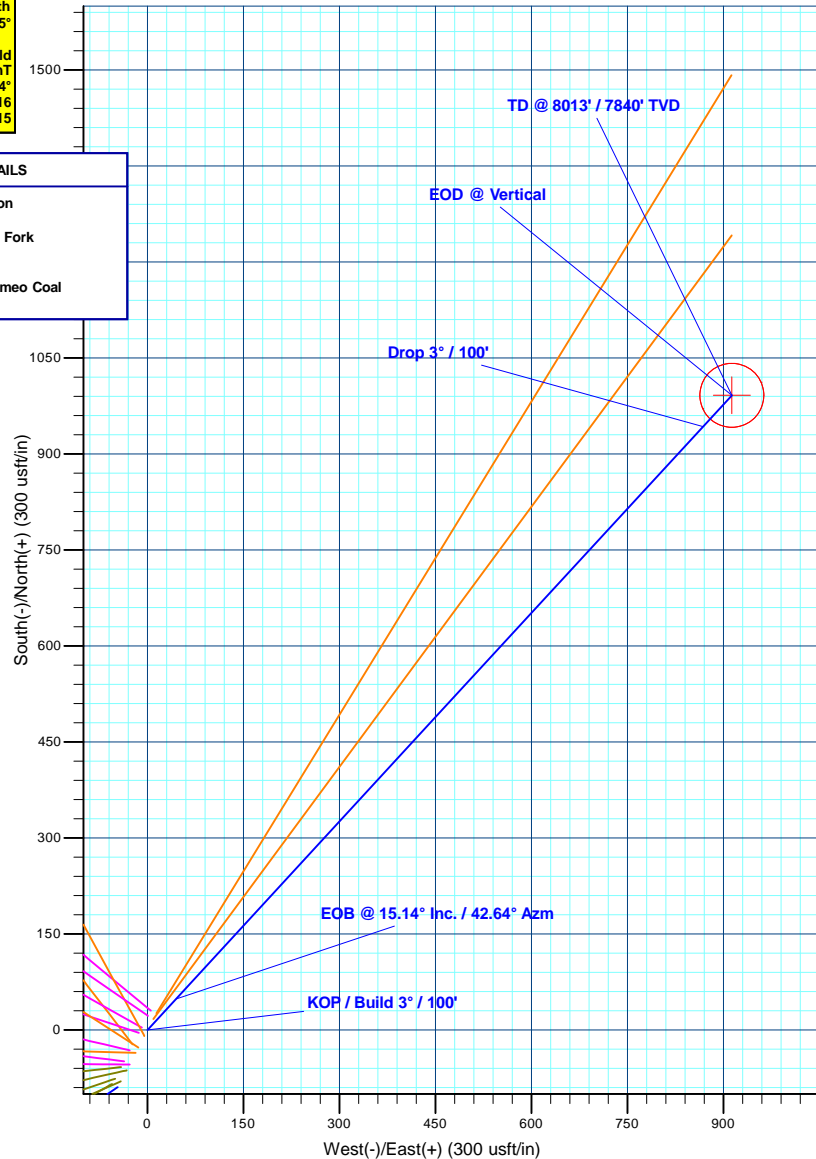
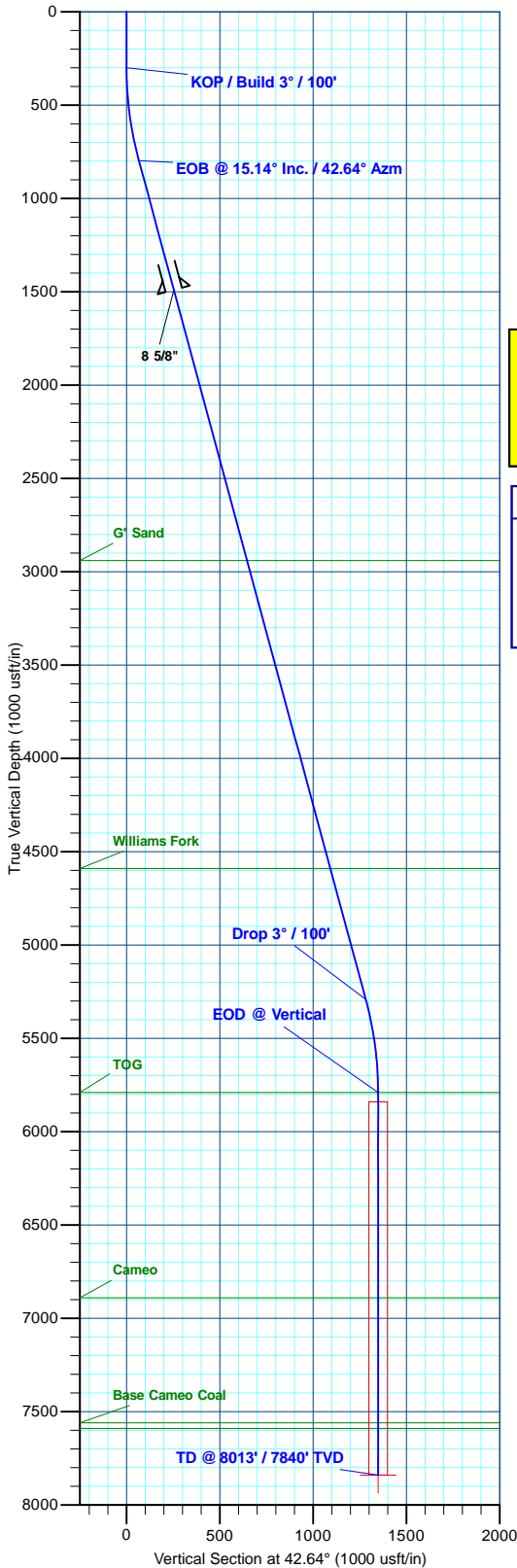
SECTION DETAILS

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	KOP / Build 3° / 100'
300.0	0.00	0.00	300.0	0.0	0.0	0.00	0.00	0.0	EOB @ 15.14° Inc. / 42.64° Azm
804.7	15.14	42.64	798.9	48.8	44.9	3.00	42.64	66.3	Drop 3° / 100'
5458.6	15.14	42.64	5291.1	943.0	868.3	0.00	0.00	1281.9	EOD @ Vertical
5963.3	0.00	0.00	5790.0	991.8	913.2	3.00	180.00	1348.2	TD @ 8013' / 7840' TVD
8013.3	0.00	0.00	7840.0	991.8	913.2	0.00	0.00	1348.2	



FORMATION TOP DETAILS

TVDPath	MDPath	Formation
2940.0	3022.9	G' Sand
4590.0	4732.2	Williams Fork
5790.0	5963.3	TOG
6890.0	7063.3	Cameo
7560.0	7733.3	Base Cameo Coal
7590.0	7763.3	Rollins



Plan: Design #1 (Piceance 29-03E/Wellbore #1)

Created By: Will Jircik Date: 9:20, September 22 2016



Well Planning Report



Database:	EDM5002	Local Co-ordinate Reference:	Well Piceance 29-03E
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 29-03E	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 29-03E				
Well Position	+N/-S	111.4 usft	Northing:	1,524,479.45 usft	Latitude:	39.250956
	+E/-W	68.5 usft	Easting:	2,351,123.73 usft	Longitude:	-107.791611
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	42.64

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	
300.0	0.00	0.00	300.0	0.0	0.0	0.00	0.00	0.00	0.00	
804.7	15.14	42.64	798.9	48.8	44.9	3.00	3.00	0.00	42.64	
5,458.6	15.14	42.64	5,291.1	943.0	868.3	0.00	0.00	0.00	0.00	
5,963.3	0.00	0.00	5,790.0	991.8	913.2	3.00	-3.00	0.00	180.00	
8,013.3	0.00	0.00	7,840.0	991.8	913.2	0.00	0.00	0.00	0.00	Piceance 29-03E



Well Planning Report



Database:	EDM5002	Local Co-ordinate Reference:	Well Piceance 29-03E
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 29-03E	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'									
300.0	0.00	0.00	300.0	0.0	0.0	0.0	0.00	0.00	0.00
400.0	3.00	42.64	400.0	1.9	1.8	2.6	3.00	3.00	0.00
500.0	6.00	42.64	499.6	7.7	7.1	10.5	3.00	3.00	0.00
600.0	9.00	42.64	598.8	17.3	15.9	23.5	3.00	3.00	0.00
700.0	12.00	42.64	697.1	30.7	28.3	41.7	3.00	3.00	0.00
800.0	15.00	42.64	794.3	47.9	44.1	65.1	3.00	3.00	0.00
EOB @ 15.14° Inc. / 42.64° Azm									
804.7	15.14	42.64	798.9	48.8	44.9	66.3	3.00	3.00	0.00
900.0	15.14	42.64	890.8	67.1	61.8	91.2	0.00	0.00	0.00
1,000.0	15.14	42.64	987.4	86.3	79.5	117.3	0.00	0.00	0.00
1,100.0	15.14	42.64	1,083.9	105.5	97.2	143.4	0.00	0.00	0.00
1,200.0	15.14	42.64	1,180.4	124.7	114.8	169.6	0.00	0.00	0.00
1,300.0	15.14	42.64	1,277.0	143.9	132.5	195.7	0.00	0.00	0.00
1,400.0	15.14	42.64	1,373.5	163.2	150.2	221.8	0.00	0.00	0.00
1,500.0	15.14	42.64	1,470.0	182.4	167.9	247.9	0.00	0.00	0.00
8 5/8"									
1,522.0	15.14	42.64	1,491.2	186.6	171.8	253.7	0.00	0.00	0.00
1,600.0	15.14	42.64	1,566.5	201.6	185.6	274.0	0.00	0.00	0.00
1,700.0	15.14	42.64	1,663.1	220.8	203.3	300.2	0.00	0.00	0.00
1,800.0	15.14	42.64	1,759.6	240.0	221.0	326.3	0.00	0.00	0.00
1,900.0	15.14	42.64	1,856.1	259.2	238.7	352.4	0.00	0.00	0.00
2,000.0	15.14	42.64	1,952.7	278.4	256.4	378.5	0.00	0.00	0.00
2,100.0	15.14	42.64	2,049.2	297.7	274.1	404.6	0.00	0.00	0.00
2,200.0	15.14	42.64	2,145.7	316.9	291.8	430.8	0.00	0.00	0.00
2,300.0	15.14	42.64	2,242.2	336.1	309.5	456.9	0.00	0.00	0.00
2,400.0	15.14	42.64	2,338.8	355.3	327.2	483.0	0.00	0.00	0.00
2,500.0	15.14	42.64	2,435.3	374.5	344.9	509.1	0.00	0.00	0.00
2,600.0	15.14	42.64	2,531.8	393.7	362.6	535.2	0.00	0.00	0.00
2,700.0	15.14	42.64	2,628.3	413.0	380.2	561.4	0.00	0.00	0.00
2,800.0	15.14	42.64	2,724.9	432.2	397.9	587.5	0.00	0.00	0.00
2,900.0	15.14	42.64	2,821.4	451.4	415.6	613.6	0.00	0.00	0.00
3,000.0	15.14	42.64	2,917.9	470.6	433.3	639.7	0.00	0.00	0.00
G' Sand									
3,022.9	15.14	42.64	2,940.0	475.0	437.4	645.7	0.00	0.00	0.00
3,100.0	15.14	42.64	3,014.5	489.8	451.0	665.8	0.00	0.00	0.00
3,200.0	15.14	42.64	3,111.0	509.0	468.7	692.0	0.00	0.00	0.00
3,300.0	15.14	42.64	3,207.5	528.2	486.4	718.1	0.00	0.00	0.00
3,400.0	15.14	42.64	3,304.0	547.5	504.1	744.2	0.00	0.00	0.00
3,500.0	15.14	42.64	3,400.6	566.7	521.8	770.3	0.00	0.00	0.00
3,600.0	15.14	42.64	3,497.1	585.9	539.5	796.4	0.00	0.00	0.00
3,700.0	15.14	42.64	3,593.6	605.1	557.2	822.6	0.00	0.00	0.00
3,800.0	15.14	42.64	3,690.2	624.3	574.9	848.7	0.00	0.00	0.00
3,900.0	15.14	42.64	3,786.7	643.5	592.6	874.8	0.00	0.00	0.00
4,000.0	15.14	42.64	3,883.2	662.8	610.3	900.9	0.00	0.00	0.00
4,100.0	15.14	42.64	3,979.7	682.0	627.9	927.0	0.00	0.00	0.00
4,200.0	15.14	42.64	4,076.3	701.2	645.6	953.2	0.00	0.00	0.00
4,300.0	15.14	42.64	4,172.8	720.4	663.3	979.3	0.00	0.00	0.00
4,400.0	15.14	42.64	4,269.3	739.6	681.0	1,005.4	0.00	0.00	0.00
4,500.0	15.14	42.64	4,365.9	758.8	698.7	1,031.5	0.00	0.00	0.00
4,600.0	15.14	42.64	4,462.4	778.0	716.4	1,057.6	0.00	0.00	0.00



Well Planning Report



Database:	EDM5002	Local Co-ordinate Reference:	Well Piceance 29-03E
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 29-03E	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	15.14	42.64	4,558.9	797.3	734.1	1,083.8	0.00	0.00	0.00
Williams Fork									
4,732.2	15.14	42.64	4,590.0	803.4	739.8	1,092.2	0.00	0.00	0.00
4,800.0	15.14	42.64	4,655.4	816.5	751.8	1,109.9	0.00	0.00	0.00
4,900.0	15.14	42.64	4,752.0	835.7	769.5	1,136.0	0.00	0.00	0.00
5,000.0	15.14	42.64	4,848.5	854.9	787.2	1,162.1	0.00	0.00	0.00
5,100.0	15.14	42.64	4,945.0	874.1	804.9	1,188.2	0.00	0.00	0.00
5,200.0	15.14	42.64	5,041.6	893.3	822.6	1,214.4	0.00	0.00	0.00
5,300.0	15.14	42.64	5,138.1	912.5	840.3	1,240.5	0.00	0.00	0.00
5,400.0	15.14	42.64	5,234.6	931.8	858.0	1,266.6	0.00	0.00	0.00
Drop 3° / 100'									
5,458.6	15.14	42.64	5,291.1	943.0	868.3	1,281.9	0.00	0.00	0.00
5,500.0	13.90	42.64	5,331.3	950.7	875.4	1,292.3	3.00	-3.00	0.00
5,600.0	10.90	42.64	5,428.9	966.4	889.9	1,313.8	3.00	-3.00	0.00
5,700.0	7.90	42.64	5,527.6	978.5	901.0	1,330.1	3.00	-3.00	0.00
5,800.0	4.90	42.64	5,626.9	986.7	908.5	1,341.2	3.00	-3.00	0.00
5,900.0	1.90	42.64	5,726.7	991.0	912.5	1,347.1	3.00	-3.00	0.00
EOD @ Vertical - TOG									
5,963.3	0.00	0.00	5,790.0	991.8	913.2	1,348.2	3.00	-3.00	0.00
6,000.0	0.00	0.00	5,826.7	991.8	913.2	1,348.2	0.00	0.00	0.00
6,100.0	0.00	0.00	5,926.7	991.8	913.2	1,348.2	0.00	0.00	0.00
6,200.0	0.00	0.00	6,026.7	991.8	913.2	1,348.2	0.00	0.00	0.00
6,300.0	0.00	0.00	6,126.7	991.8	913.2	1,348.2	0.00	0.00	0.00
6,400.0	0.00	0.00	6,226.7	991.8	913.2	1,348.2	0.00	0.00	0.00
6,500.0	0.00	0.00	6,326.7	991.8	913.2	1,348.2	0.00	0.00	0.00
6,600.0	0.00	0.00	6,426.7	991.8	913.2	1,348.2	0.00	0.00	0.00
6,700.0	0.00	0.00	6,526.7	991.8	913.2	1,348.2	0.00	0.00	0.00
6,800.0	0.00	0.00	6,626.7	991.8	913.2	1,348.2	0.00	0.00	0.00
6,900.0	0.00	0.00	6,726.7	991.8	913.2	1,348.2	0.00	0.00	0.00
7,000.0	0.00	0.00	6,826.7	991.8	913.2	1,348.2	0.00	0.00	0.00
Cameo									
7,063.3	0.00	0.00	6,890.0	991.8	913.2	1,348.2	0.00	0.00	0.00
7,100.0	0.00	0.00	6,926.7	991.8	913.2	1,348.2	0.00	0.00	0.00
7,200.0	0.00	0.00	7,026.7	991.8	913.2	1,348.2	0.00	0.00	0.00
7,300.0	0.00	0.00	7,126.7	991.8	913.2	1,348.2	0.00	0.00	0.00
7,400.0	0.00	0.00	7,226.7	991.8	913.2	1,348.2	0.00	0.00	0.00
7,500.0	0.00	0.00	7,326.7	991.8	913.2	1,348.2	0.00	0.00	0.00
7,600.0	0.00	0.00	7,426.7	991.8	913.2	1,348.2	0.00	0.00	0.00
7,700.0	0.00	0.00	7,526.7	991.8	913.2	1,348.2	0.00	0.00	0.00
Base Cameo Coal									
7,733.3	0.00	0.00	7,560.0	991.8	913.2	1,348.2	0.00	0.00	0.00
Rollins									
7,763.3	0.00	0.00	7,590.0	991.8	913.2	1,348.2	0.00	0.00	0.00
7,800.0	0.00	0.00	7,626.7	991.8	913.2	1,348.2	0.00	0.00	0.00
7,900.0	0.00	0.00	7,726.7	991.8	913.2	1,348.2	0.00	0.00	0.00
8,000.0	0.00	0.00	7,826.7	991.8	913.2	1,348.2	0.00	0.00	0.00
TD @ 8013' / 7840' TVD									
8,013.3	0.00	0.00	7,840.0	991.8	913.2	1,348.2	0.00	0.00	0.00



Well Planning Report



Database:	EDM5002	Local Co-ordinate Reference:	Well Piceance 29-03E
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 29-03E	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									
Piceance 29-03E	0.00	0.00	7,840.0	991.8	913.2	1,525,447.88	2,352,061.68	39.253679	-107.788386
- plan hits target center									
- Circle (radius 50.0)									

Casing Points				
Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
1,522.0	1,491.2	8 5/8"	8-5/8	11

Formations					
Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
3,022.9	2,940.0	G' Sand		0.00	
4,732.2	4,590.0	Williams Fork		0.00	
5,963.3	5,790.0	TOG		0.00	
7,063.3	6,890.0	Cameo		0.00	
7,733.3	7,560.0	Base Cameo Coal		0.00	
7,763.3	7,590.0	Rollins		0.00	

Plan Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates			
		+N/-S (usft)	+E/-W (usft)	Comment	
300.0	300.0	0.0	0.0	KOP / Build 3° / 100'	
804.7	798.9	48.8	44.9	EOB @ 15.14° Inc. / 42.64° Azm	
5,458.6	5,291.1	943.0	868.3	Drop 3° / 100'	
5,963.3	5,790.0	991.8	913.2	EOD @ Vertical	
8,013.3	7,840.0	991.8	913.2	TD @ 8013' / 7840' TVD	