



Project: Mesa County, CO
 Site: Nichols 24-06A
 Well: Nichols 0994-24-06W
 Wellbore: Wellbore #1
 Design: Design #1
 Latitude: 39.264597
 Longitude: -107.830633
 Ground Level: 7137.0
 well @ 7167.0usft (H&P #522)



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 Nichols 0994-24-06W, True North
 Vertical (TVD) Reference: well @ 7167.0usft (H&P #522)
 Section (VS) Reference: Slot - (0.0N, 0.0E)
 Measured Depth Reference: well @ 7167.0usft (H&P #522)
 Calculation Method: Minimum Curvature

WELL DETAILS:

Nichols 0994-24-06W

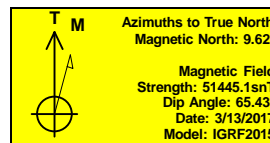
+N/-S	+E/-W	Northing	Ground Level: Easting	7137.0 Latitude	Longitude
0.0	0.0	1529727.19	2340204.38	39.264597	-107.830633

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

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
PBHL - Nichols 0994-24-06W	7362.0	442.2	-1305.2	1530202.73	2338910.96	39.265811	-107.835243

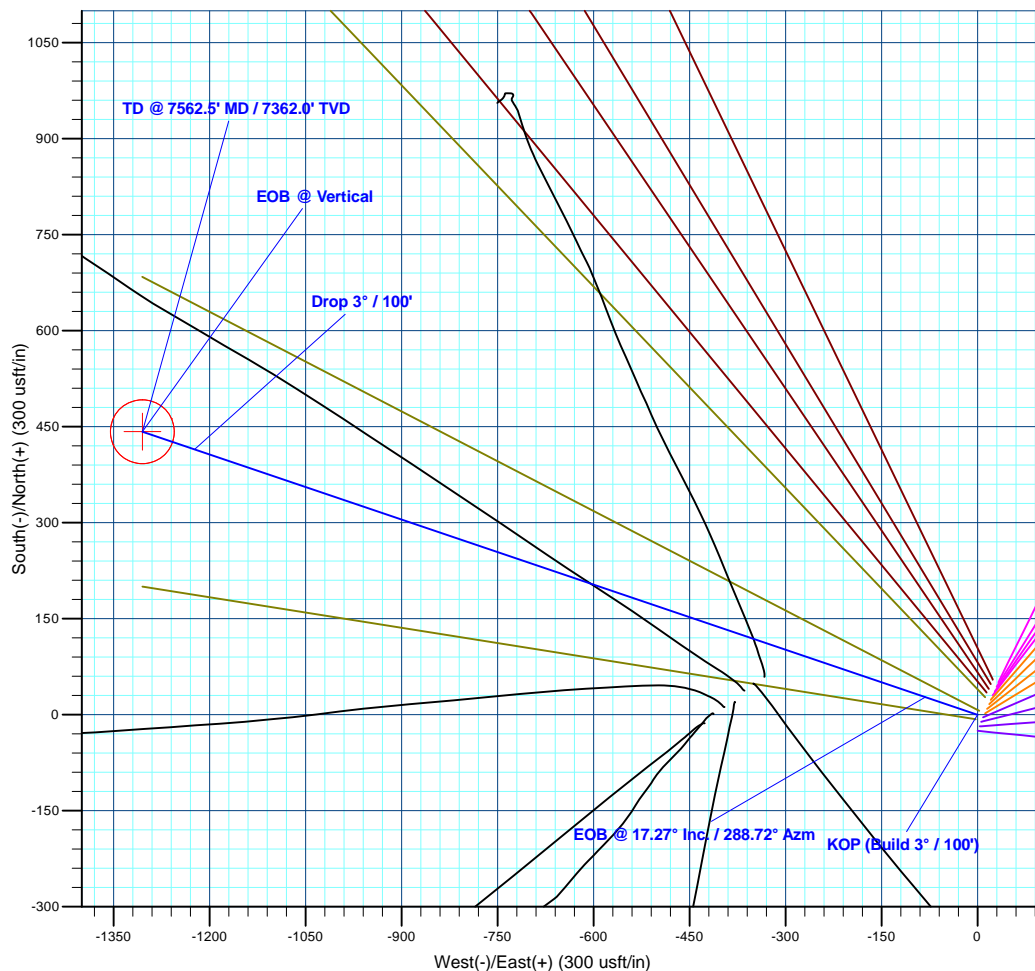
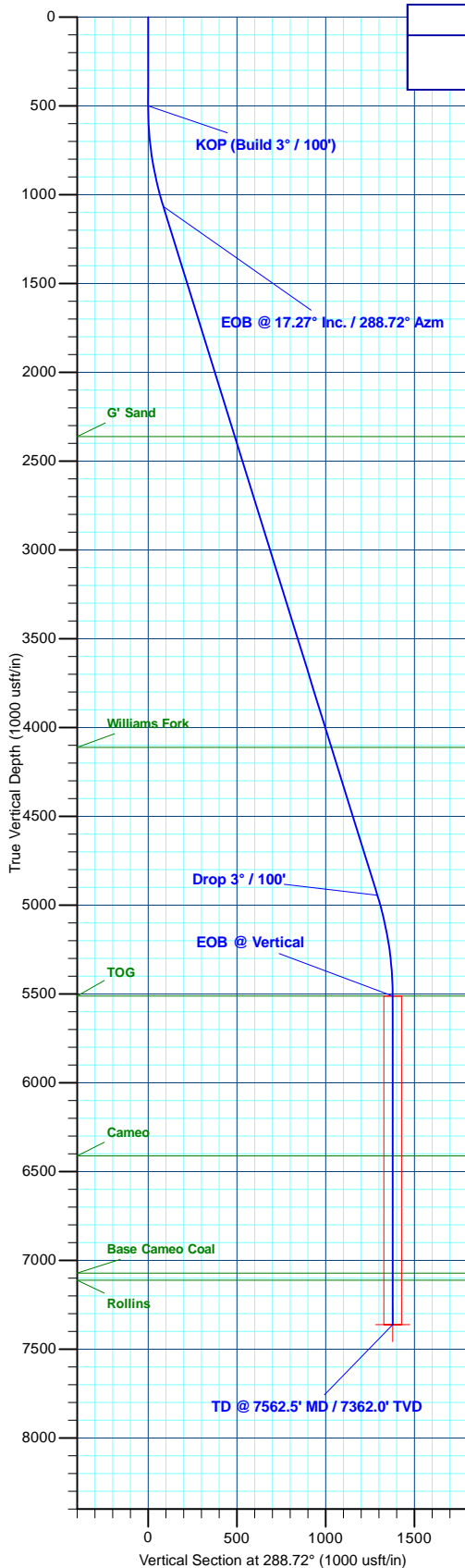
SECTION DETAILS

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')
1075.8	17.27	288.72	1067.1	27.6	-81.6	3.00	288.72	86.1	EOB @ 17.27° Inc. / 288.72° Azm
5136.7	17.27	288.72	4944.9	414.6	-1223.6	0.00	0.00	1291.9	Drop 3° / 100'
5712.5	0.00	0.00	5512.0	442.2	-1305.2	3.00	180.00	1378.1	EOB @ Vertical
7562.5	0.00	0.00	7362.0	442.2	-1305.2	0.00	0.00	1378.1	TD @ 7562.5' MD / 7362.0' TVD



FORMATION TOP DETAILS

TVDPath	MDPath	Formation
2362.0	2431.8	G' Sand
4112.0	4264.5	Williams Fork
5512.0	5712.5	TOG
6412.0	6612.5	Cameo
7072.0	7272.5	Base Cameo Coal
7112.0	7312.5	Rollins



Plan: Design #1 (Nichols 0994-24-06W/Wellbore #1)

Created By: Will Jircik Date: 17:06, March 13 2017



Laramie Energy, LLC

Mesa County, CO

Nichols 24-06A

Nichols 0994-24-06W

Wellbore #1

Plan: Design #1

QES Well Planning Report

13 March, 2017





Well Planning Report



Database:	EDM5002	Local Co-ordinate Reference:	Well Nichols 0994-24-06W
Company:	Laramie Energy, LLC	TVD Reference:	well @ 7167.0usft (H&P #522)
Project:	Mesa County, CO	MD Reference:	well @ 7167.0usft (H&P #522)
Site:	Nichols 24-06A	North Reference:	True
Well:	Nichols 0994-24-06W	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		Nichols 24-06A			
Site Position:		Northing:	1,529,702.08 usft	Latitude:	39.264528
From:	Lat/Long	Easting:	2,340,203.74 usft	Longitude:	-107.830633
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	-1.47 °

Well		Nichols 0994-24-06W				
Well Position	+N/-S	25.1 usft	Northing:	1,529,727.19 usft	Latitude:	39.264597
	+E/-W	0.0 usft	Easting:	2,340,204.38 usft	Longitude:	-107.830633
Position Uncertainty		0.0 usft	Wellhead Elevation:	0.0 usft	Ground Level:	7,137.0 usft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	3/13/2017	9.62	65.43	51,445

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	288.72

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	
500.0	0.00	0.00	500.0	0.0	0.0	0.00	0.00	0.00	0.00	
1,075.8	17.27	288.72	1,067.1	27.6	-81.6	3.00	3.00	0.00	288.72	
5,136.7	17.27	288.72	4,944.9	414.6	-1,223.6	0.00	0.00	0.00	0.00	
5,712.5	0.00	0.00	5,512.0	442.2	-1,305.2	3.00	-3.00	0.00	180.00	
7,562.5	0.00	0.00	7,362.0	442.2	-1,305.2	0.00	0.00	0.00	0.00	PBHL - Nichols 0994-



Well Planning Report



Database:	EDM5002	Local Co-ordinate Reference:	Well Nichols 0994-24-06W
Company:	Laramie Energy, LLC	TVD Reference:	well @ 7167.0usft (H&P #522)
Project:	Mesa County, CO	MD Reference:	well @ 7167.0usft (H&P #522)
Site:	Nichols 24-06A	North Reference:	True
Well:	Nichols 0994-24-06W	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	288.72	600.0	0.8	-2.5	2.6	3.00	3.00	0.00
700.0	6.00	288.72	699.6	3.4	-9.9	10.5	3.00	3.00	0.00
800.0	9.00	288.72	798.8	7.5	-22.3	23.5	3.00	3.00	0.00
900.0	12.00	288.72	897.1	13.4	-39.5	41.7	3.00	3.00	0.00
1,000.0	15.00	288.72	994.3	20.9	-61.6	65.1	3.00	3.00	0.00
EOB @ 17.27° Inc. / 288.72° Azm									
1,075.8	17.27	288.72	1,067.1	27.6	-81.6	86.1	3.00	3.00	0.00
1,100.0	17.27	288.72	1,090.2	29.9	-88.4	93.3	0.00	0.00	0.00
1,200.0	17.27	288.72	1,185.7	39.5	-116.5	123.0	0.00	0.00	0.00
1,300.0	17.27	288.72	1,281.2	49.0	-144.6	152.7	0.00	0.00	0.00
1,400.0	17.27	288.72	1,376.7	58.5	-172.8	182.4	0.00	0.00	0.00
1,500.0	17.27	288.72	1,472.2	68.1	-200.9	212.1	0.00	0.00	0.00
8 5/8"									
1,530.0	17.27	288.72	1,500.8	70.9	-209.3	221.0	0.00	0.00	0.00
1,600.0	17.27	288.72	1,567.7	77.6	-229.0	241.8	0.00	0.00	0.00
1,700.0	17.27	288.72	1,663.2	87.1	-257.1	271.5	0.00	0.00	0.00
1,800.0	17.27	288.72	1,758.7	96.6	-285.2	301.2	0.00	0.00	0.00
1,900.0	17.27	288.72	1,854.1	106.2	-313.4	330.9	0.00	0.00	0.00
2,000.0	17.27	288.72	1,949.6	115.7	-341.5	360.6	0.00	0.00	0.00
2,100.0	17.27	288.72	2,045.1	125.2	-369.6	390.3	0.00	0.00	0.00
2,200.0	17.27	288.72	2,140.6	134.8	-397.7	419.9	0.00	0.00	0.00
2,300.0	17.27	288.72	2,236.1	144.3	-425.9	449.6	0.00	0.00	0.00
2,400.0	17.27	288.72	2,331.6	153.8	-454.0	479.3	0.00	0.00	0.00
G' Sand									
2,431.8	17.27	288.72	2,362.0	156.8	-462.9	488.8	0.00	0.00	0.00
2,500.0	17.27	288.72	2,427.1	163.3	-482.1	509.0	0.00	0.00	0.00
2,600.0	17.27	288.72	2,522.6	172.9	-510.2	538.7	0.00	0.00	0.00
2,700.0	17.27	288.72	2,618.1	182.4	-538.4	568.4	0.00	0.00	0.00
2,800.0	17.27	288.72	2,713.6	191.9	-566.5	598.1	0.00	0.00	0.00
2,900.0	17.27	288.72	2,809.0	201.4	-594.6	627.8	0.00	0.00	0.00
3,000.0	17.27	288.72	2,904.5	211.0	-622.7	657.5	0.00	0.00	0.00
3,100.0	17.27	288.72	3,000.0	220.5	-650.8	687.2	0.00	0.00	0.00
3,200.0	17.27	288.72	3,095.5	230.0	-679.0	716.9	0.00	0.00	0.00
3,300.0	17.27	288.72	3,191.0	239.6	-707.1	746.6	0.00	0.00	0.00
3,400.0	17.27	288.72	3,286.5	249.1	-735.2	776.3	0.00	0.00	0.00
3,500.0	17.27	288.72	3,382.0	258.6	-763.3	805.9	0.00	0.00	0.00
3,600.0	17.27	288.72	3,477.5	268.1	-791.5	835.6	0.00	0.00	0.00
3,700.0	17.27	288.72	3,573.0	277.7	-819.6	865.3	0.00	0.00	0.00
3,800.0	17.27	288.72	3,668.5	287.2	-847.7	895.0	0.00	0.00	0.00
3,900.0	17.27	288.72	3,763.9	296.7	-875.8	924.7	0.00	0.00	0.00
4,000.0	17.27	288.72	3,859.4	306.3	-903.9	954.4	0.00	0.00	0.00
4,100.0	17.27	288.72	3,954.9	315.8	-932.1	984.1	0.00	0.00	0.00
4,200.0	17.27	288.72	4,050.4	325.3	-960.2	1,013.8	0.00	0.00	0.00
Williams Fork									
4,264.5	17.27	288.72	4,112.0	331.5	-978.3	1,032.9	0.00	0.00	0.00
4,300.0	17.27	288.72	4,145.9	334.8	-988.3	1,043.5	0.00	0.00	0.00
4,400.0	17.27	288.72	4,241.4	344.4	-1,016.4	1,073.2	0.00	0.00	0.00



Well Planning Report



Database:	EDM5002	Local Co-ordinate Reference:	Well Nichols 0994-24-06W
Company:	Laramie Energy, LLC	TVD Reference:	well @ 7167.0usft (H&P #522)
Project:	Mesa County, CO	MD Reference:	well @ 7167.0usft (H&P #522)
Site:	Nichols 24-06A	North Reference:	True
Well:	Nichols 0994-24-06W	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)
4,500.0	17.27	288.72	4,336.9	353.9	-1,044.6	1,102.9	0.00	0.00	0.00
4,600.0	17.27	288.72	4,432.4	363.4	-1,072.7	1,132.6	0.00	0.00	0.00
4,700.0	17.27	288.72	4,527.9	373.0	-1,100.8	1,162.3	0.00	0.00	0.00
4,800.0	17.27	288.72	4,623.4	382.5	-1,128.9	1,192.0	0.00	0.00	0.00
4,900.0	17.27	288.72	4,718.8	392.0	-1,157.0	1,221.6	0.00	0.00	0.00
5,000.0	17.27	288.72	4,814.3	401.5	-1,185.2	1,251.3	0.00	0.00	0.00
5,100.0	17.27	288.72	4,909.8	411.1	-1,213.3	1,281.0	0.00	0.00	0.00
Drop 3° / 100'									
5,136.7	17.27	288.72	4,944.9	414.6	-1,223.6	1,291.9	0.00	0.00	0.00
5,200.0	15.38	288.72	5,005.6	420.3	-1,240.5	1,309.7	3.00	-3.00	0.00
5,300.0	12.38	288.72	5,102.7	428.0	-1,263.2	1,333.7	3.00	-3.00	0.00
5,400.0	9.38	288.72	5,200.9	434.0	-1,281.0	1,352.6	3.00	-3.00	0.00
5,500.0	6.38	288.72	5,299.9	438.4	-1,294.0	1,366.3	3.00	-3.00	0.00
5,600.0	3.38	288.72	5,399.6	441.1	-1,302.1	1,374.8	3.00	-3.00	0.00
5,700.0	0.38	288.72	5,499.5	442.2	-1,305.2	1,378.0	3.00	-3.00	0.00
EOB @ Vertical - TOG									
5,712.5	0.00	0.00	5,512.0	442.2	-1,305.2	1,378.1	3.00	-3.00	0.00
5,800.0	0.00	0.00	5,599.5	442.2	-1,305.2	1,378.1	0.00	0.00	0.00
5,900.0	0.00	0.00	5,699.5	442.2	-1,305.2	1,378.1	0.00	0.00	0.00
6,000.0	0.00	0.00	5,799.5	442.2	-1,305.2	1,378.1	0.00	0.00	0.00
6,100.0	0.00	0.00	5,899.5	442.2	-1,305.2	1,378.1	0.00	0.00	0.00
6,200.0	0.00	0.00	5,999.5	442.2	-1,305.2	1,378.1	0.00	0.00	0.00
6,300.0	0.00	0.00	6,099.5	442.2	-1,305.2	1,378.1	0.00	0.00	0.00
6,400.0	0.00	0.00	6,199.5	442.2	-1,305.2	1,378.1	0.00	0.00	0.00
6,500.0	0.00	0.00	6,299.5	442.2	-1,305.2	1,378.1	0.00	0.00	0.00
6,600.0	0.00	0.00	6,399.5	442.2	-1,305.2	1,378.1	0.00	0.00	0.00
Cameo									
6,612.5	0.00	0.00	6,412.0	442.2	-1,305.2	1,378.1	0.00	0.00	0.00
6,700.0	0.00	0.00	6,499.5	442.2	-1,305.2	1,378.1	0.00	0.00	0.00
6,800.0	0.00	0.00	6,599.5	442.2	-1,305.2	1,378.1	0.00	0.00	0.00
6,900.0	0.00	0.00	6,699.5	442.2	-1,305.2	1,378.1	0.00	0.00	0.00
7,000.0	0.00	0.00	6,799.5	442.2	-1,305.2	1,378.1	0.00	0.00	0.00
7,100.0	0.00	0.00	6,899.5	442.2	-1,305.2	1,378.1	0.00	0.00	0.00
7,200.0	0.00	0.00	6,999.5	442.2	-1,305.2	1,378.1	0.00	0.00	0.00
Base Cameo Coal									
7,272.5	0.00	0.00	7,072.0	442.2	-1,305.2	1,378.1	0.00	0.00	0.00
7,300.0	0.00	0.00	7,099.5	442.2	-1,305.2	1,378.1	0.00	0.00	0.00
Rollins									
7,312.5	0.00	0.00	7,112.0	442.2	-1,305.2	1,378.1	0.00	0.00	0.00
7,400.0	0.00	0.00	7,199.5	442.2	-1,305.2	1,378.1	0.00	0.00	0.00
7,500.0	0.00	0.00	7,299.5	442.2	-1,305.2	1,378.1	0.00	0.00	0.00
TD @ 7562.5' MD / 7362.0' TVD									
7,562.5	0.00	0.00	7,362.0	442.2	-1,305.2	1,378.1	0.00	0.00	0.00



Well Planning Report



Database:	EDM5002	Local Co-ordinate Reference:	Well Nichols 0994-24-06W
Company:	Laramie Energy, LLC	TVD Reference:	well @ 7167.0usft (H&P #522)
Project:	Mesa County, CO	MD Reference:	well @ 7167.0usft (H&P #522)
Site:	Nichols 24-06A	North Reference:	True
Well:	Nichols 0994-24-06W	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 - Nichols 0994-24	0.00	0.00	7,362.0	442.2	-1,305.2	1,530,202.73	2,338,910.96	39.265811	-107.835243
- plan hits target center									
- Circle (radius 50.0)									

Casing Points				
Measured Depth	Vertical Depth		Casing Diameter	Hole Diameter
(usft)	(usft)	Name	(")	(")
1,530.0	1,500.8	8 5/8"	8-5/8	11

Formations						
Measured Depth	Vertical Depth			Dip	Dip Direction	
(usft)	(usft)	Name	Lithology	(°)	(°)	
2,431.8	2,362.0	G' Sand				
4,264.5	4,112.0	Williams Fork				
5,712.5	5,512.0	TOG				
6,612.5	6,412.0	Cameo				
7,272.5	7,072.0	Base Cameo Coal				
7,312.5	7,112.0	Rollins				

Plan Annotations					
Measured Depth	Vertical Depth	Local Coordinates			
(usft)	(usft)	+N/-S	+E/-W	Comment	
(usft)	(usft)	(usft)	(usft)		
500.0	500.0	0.0	0.0	KOP (Build 3° / 100')	
1,075.8	1,067.1	27.6	-81.6	EOB @ 17.27° Inc. / 288.72° Azm	
5,136.7	4,944.9	414.6	-1,223.6	Drop 3° / 100'	
5,712.5	5,512.0	442.2	-1,305.2	EOB @ Vertical	
7,562.5	7,362.0	442.2	-1,305.2	TD @ 7562.5' MD / 7362.0' TVD	